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Consumption Still Large

Underestimated Because of the Shrinkage in New Orders

The stagnation in iron and steel markets continues to contrast sharply with the large tonnage that is moving from blast furnaces and rolling mills to distributers and consumers. New orders are as deceptive as a measure of consumption, now that buying is for immediate needs, as they were in the fall of 1909, when on a rising market contracts were made running months ahead.

That prices have not yielded under continued dullness is due to the months of profitable business the mills have had, and to the fact that as a rule buyers are still taking full shipments under their contracts. There is no indication of any survival-of-the-fittest campaign for orders at cut prices.

The closing down of the steel plant and wire mills of the Pittsburgh Steel Company at Monessen until September 1 has been given undue importance as an index of conditions, in some comments of the week. On the other hand, one large steel interest at Pittsburgh reports that its specifications and new orders thus far in August have been more than in the corresponding part of July.

The gradual adjustment of production to consumption is indicated in the case of the United States Steel Corporation by the fact that 41 of its blast furnaces are now idle, against 39 August 1, 35 July 1 and 31 June 1. The two furnaces blown out this month are at McKeesport, Pa., and Lorain, Ohio. Meantime the various steel companies are eating into their stocks of pig iron.

The principal rail order reported is for 10,000 tons for the National Railways of Mexico taken by the Lackawanna Steel Company in close competition. These lines are expected to make further purchases this year. The Illinois Steel Company has taken a domestic order for 9000 tons of Bessemer rails.

After many months the water supply line for the Portland, Maine, district is up, and alternative bids will be opened September 12 for cast iron and steel pipe. In cast iron 42-in. pipe is called for, the total being 21,500 tons. If riveted steel pipe is decided on, about 16,000 tons of plates will be required.

In steel bars while 1.40c. is the market on large contracts, the mills have closed considerable business at 1.45. Concrete reinforcing bars have been rather active in several markets. Bar iron is weaker. An effort to revive an organization of Eastern iron rolling mills on the lines of the old Eastern Bar Iron Association has been unsuccessful.

Pig iron buying has become even more contracted. A few large melters have made offers under the lowest prices actually done, but furnaces have promptly refused them. That the furnaces have accepted a cer-

tain amount of business at the low prices of recent weeks does not mean that they can come out whole at this level. Thus far the shipments made on higher priced orders have compensated in part. But as old contracts run out there is no such equalizer, and a situation is created that will bear close watching. If it should force further cutting down of production the withdrawal of present prices might be rather abrupt.

In response to inquiries from a large pig iron selling firm 159 foundries report that they are melting as much iron as in 1907, while 202 report a larger and 174 a smaller melt. The net increase for those reporting is put at 1.2 per cent.

"Scientific" and Practical Tariff Making

Impatience has been expressed in some quarters at the arrangements for extending over a period of two years the work of the tariff experts provided for by the last Congress. We are told that the burdens the people are bearing as a result of the failure to make a "scientific" revision of the tariff last year should not be so long continued and that the only real relief is quick relief. In reply, those who have made such large promises for the perfectly adjusted tariff which the President's investigators will be able to suggest say that two years is not too long to wait. In fact, a recent newspaper article, purporting to represent the views of the President, definitely stated that the tariff experts would submit within two years recommendations for the revision of certain schedules.

The importance of tariff legislation as a factor in the raising or lowering of prices of many American products has been exaggerated. Not only so, but there is just now an amazing amount of credulity as to what can be done by a cost finding investigation of home and foreign industries. The doctrine has been laid down that a protective duty should represent the difference between the home and foreign cost of manufacture plus a "reasonable profit." What home cost is to be taken, in the case of steel billets, for example? The cost at Pittsburgh, Philadelphia, Birmingham, Pueblo or at the new steel plant at Irondale, Wash.? Shall it be the cost to a self-contained steel company, owning ore, coal, railroads and vessels; or to one having none of these, though operating its own blast furnaces; or, again, to one that must buy its pig iron in the market? And when it comes to foreign works, will the comparison be with British, German, Belgian or French works? With those best located for low assembling costs, or those located at or near shipping ports, though remote from fuel or ore? Since costs also depend upon trade conditions, will those for the United States be the costs of 1898, of 1906 and 1907, or the average for, say, a 10-year period? And which 10-year period? And will freights to the districts of largest consumption figure in the computation or will they be ruled out as having no relation to works costs? And how will the new tariff experts come any nearer to the foreign steel makers' costs than were the figures secured abroad by Chairman Payne's special agents?

As to the question of a "reasonable profit," there is about the same fitness in a tariff expert settling it as in a government "economist" making a physical valuation of a railroad as a basis for determining the reasonableness of a freight rate.

But assuming that the Tariff Board has made its recommendations, and assuming, as we must, that it has analyzed with fine discrimination the yields of various industries and determined their reasonableness, the work of the real tariff makers has then only begun. We have seen no plan put forth as yet for the passing of expert judgment on the "reasonableness" of the various State and district demands for protection which in the final trying out give many tariff schedules the form in which they go on the statute books. In the past where "scientific," which is to say theoretical, tariff rates have come in conflict with practical schedules—those which have grown out of experience or that are advocated by States or districts whose representatives regardless of party lines are willing to co-operate with those of other States and districts—usually the scientific schedules have been voted down. In so far as the tariff is a local question, to that extent will the programmes of party platforms and the recommendations of experts always be subject to modification. Those who have been so free with promises of scientifically graded reduction will find that the tariff is still a first-class problem in practical politics.

Overbuilding of Vessels and Steel Works

A text is made by the *Marine Review* of the fact that in this season of the largest iron ore movement on the Great Lakes, nearly 6,500,000 tons more being brought down up to August 1 than in the same period of the record year 1909, 20 per cent. of the fleet has been out of commission. With the same percentage remaining idle, it would still be possible to move 50,000,000 tons of ore this year, though, as we have already indicated, owing to the state of the iron trade no such total is probable. The plain conclusion is that with a capacity for carrying more than 60,000,000 tons of ore there are too many boats. This is a condition to which the lake trade is no stranger. The last year in which it was brought home forcibly to the vessel owning interests was 1904. Since that year the building of bulk freighters has gone on at an astonishing pace. We are told that

> The readiness with which they all found profitable employment naturally attracted the promoter who was always anxious to help a good thing along. Ships were built that probably would not have been built normally. It has required such a season as this, when the volume of trade moved is the heaviest on record, to emphasize the fact beyond all argument that shipbuilding has been overdone. There will be no more ships built by the promoter for the present. Any one that goes about with a prospectus showing glittering profits will pour his tales into deaf ears. Shipbuilding for some time to come will be confined to the iron ore producing steel making companies which can use them in their own business.

While no parallel is found in the steel industry to this stimulation of lake vessel building by promoters' methods, there is a parallel situation in the production in the past 12 months of a record tonnage of iron and steel with capacity existing at the same time for a still larger output. Usually, when excessive capacity is complained of, production is on a scale considerably less than the record. It is the concurrence of the greatest production the industry has known with a capacity, represented by modern and highly efficient plant, much beyond the consumptive demand, that has made 1910 so unique in its disappointments. In the last period of prosperity in the iron trade profits were accumulated, permitting large expenditures by the leading com-

panies in building new and adding to old works. At the same time there has been improvement in practice, always a factor in this country, and which every year makes an addition to output equal to the producing capacity of a certain percentage of new plant. On the lakes this is represented by the increased rapidity of loading and unloading ore vessels, the latter due to better equipment at receiving docks, and the former to the special construction of vessel hatches. It has made a measurable addition to the number of trips a vessel can make in a season, and has had the same effect on the freight situation as the building of a certain number of new boats.

What must take place in the steel industry as in the lake trade is a growing up of demand to capacity, and a necessary element in such growing up is time. Meanwhile the building of new steel works as well as the building of new ore carrying vessels will wait on the process of absorption.

The Automobile and the Farmer

One of the significant incidents of the year has been the enormous number of automobiles purchased by farmers. To the average man in the city the automobile is merely a luxury, and a very expensive one. What he is obliged to pay simply for storage is a formidable item. Accidents on crowded streets are frequent and costly. Repair men are quick to take advantage of a customer who is unfamiliar with machinery. It is probably not unfair to say that there are now in use in the large cities more automobiles than there are people who can really afford the outlay for a mere luxury.

In the country, however, the city man's toy becomes an economic investment, which brings satisfactory returns on its cost. The farmer's time is valuable. Nature allows him only a few days in which to harvest any particular crop, and his season is correspondingly short in planting and seeding. In a critical period, when conditions are most favorable for planting or harvesting, the time that the automobile saves in necessary errands makes it an economic agency of production. The mere saving of time, however, is only a small part of the usefulness of the automobile in the country. A few years ago there was much pessimistic talk about the tendency of farmers to "retire" and live in small towns on the rent received from their land. The automobile is now keeping the owner on his land. His family, which wanted to live in town for social advantages, has discovered that it is more satisfactory to enjoy the full income of the farm and own an automobile which can run to the city in the time that would be spent in walking a few blocks than to pay rent and other expenses of living in town. The rural mail delivery, the telephone and the automobile give to the family in the country, owning a good farm, the command of social advantages that are enjoyed by only a few of the people who live in cities. The field of trade that has thus been opened to the automobile manufacturer is almost unlimited.

The remarkable success of the automobile makers in selling their product to the farmers may suggest an opportunity to manufacturers in many other lines who have overlooked the possibilities of agricultural trade. The American farmer of to-day is not the man of even 25 years ago. In the period that followed the Civil War, until about 1890, the area under cultivation increased more rapidly than population in the United States. Overproduction during this period caused a disastrous decline in prices, which was accelerated by a large expansion of wheat growing in Russia, Argentina and India. Since 1890 population in the United States has increased faster than the area under the plow, and during the past 15 years the farmer has profited by an almost continuous advance in the average of agricultural prices. The demand for farm products is increasing more rapidly than the supply, and the farmer will profit more and more from this condition in years to come. Farmers who have paid cash for automobiles this year may have needed credit on a $15 road cart 20 years ago, and they will be equally liberal in the future in patronizing manufacturers or merchants who can offer them substantial value for their money.

Centralizing the German Pig Iron Trade

As is indicated in our German market letter the movement to organize the pig iron producers of Germany and Luxemburg into a syndicate has fallen through, though for some weeks the trade had been hopeful of its success. The question of allotments was the rock on which the whole scheme split, as it will be the most threatening of all the questions the steel works syndicate must face when its renewal comes up two years hence. However, a pig iron selling agency covering the product of certain districts has been arranged, and its first move was expected to be an advance in the price of pig iron for 1911, seeing that the Coal Syndicate has decided to advance coke 1.50 marks. The ability of the new selling organization to control the pig iron situation even in the districts to which it will confine itself is doubted. One feature, which will be watched for its bearing on the market in the United States, is that this pig iron agency will represent a large part of the German production of ferromanganese and ferrosilicon. This fact has already resulted in a firmer market for those products, and in the case of ferrosilicon it has been agreed to book no orders for 1912 before October 1.

The Brussels Exposition Fire

The long expected has happened. A great universal exposition has been ravaged by fire. But this first experience, instead of taking place in the United States, occurred in Europe, whence originated the savage attacks on our inflammable construction whenever a world's fair has been held here, from the Centennial Exposition at Philadelphia, 34 years ago, down to the last effort of this kind. The fire at the Brussels Exposition, which occurred August 14, was a calamity which will be universally deplored. The financial loss is not so great as was at first feared, but it will be heavy enough, probably approximating $20,000,000, but many articles of historic interest were burned which can never be replaced. The world has thus suffered irreparable loss, not only in the destruction actually wrought at Brussels, but in the probable refusal hereafter by owners of rare and curious objects of ancient and modern art to permit them to be placed on view at expositions, for the edification of the masses. It would, of course, be possible to insure safety from fire by the

erection of fireproof buildings, but this would require such a heavy outlay that the cost would be prohibitive.

Drilling Machine Nomenclature

Some of the manufacturers of drilling machines are making the effort to eliminate the word "drill," as applied to a machine. Custom has established the word in the vernacular of the trade. But a drill is a small tool. The machine in which it is employed might as correctly be called a "driller" as a milling machine a miller. No one has ever called a milling machine a "mill." Drill press is an entirely proper expression for vertical machines, even to those of the larger sizes, though, as a general rule, the name is given to the smaller and medium types. It is seldom if ever used in connection with a horizontal machine. "Drilling machine" is applicable to all types, and probably would be accepted as the best usage. Vertical drilling machines and horizontal drilling machines make the necessary distinction. In referring to the sensitive types, the expression "sensitive drill press" may be preferred by many. No one will dispute the contention that the word "drill" should be wiped out of trade parlance as applied to machinery.

The Foundry Pig Iron Trade

Result of the Canvass Made by Hickman, Williams & Co.

Hickman, Williams & Co. recently addressed a letter of inquiry from their Cincinnati office to a large number of foundrymen on the condition of the foundry trade. The purpose of the inquiry was to draw out the views of those addressed on the cause of the present depression and their suggestions as to a remedy for it, and to get a comparison of existing conditions with those in the active period of 1907. The firm has favored us with a copy of its digest of the replies, from which the following extracts are taken:

To the circular sent out by us on August 2 we have received something over 700 replies. In some cases answers were made to all the questions asked and in others to but one or more. We have classified these answers as best we could and trust the results will prove as interesting to our correspondents as they have to us.

The reasons given in answer to Question No. 1, "To what do you attribute the present depression in the iron market?" are:

174. Say no opinion to express.
185. Overproduction of iron.
12. General business depression.
5. Is no depression.
17. Lack of confidence in business outlook.
25. Too much politics and political agitation.
20. Legislation adverse to railroads and large corporations.
20. Uncertainty of crops and fear of crop failure.
7. General speculation in Wall Street.
13. Price too high.
4. Overpurchases last fall.
26. Undue high prices last fall, bringing about an ill-advised boom.
9. Lack of railroad buying.
3. Inability of railroads to raise money on securities.
3. Railroads staying out of the market to influence legislation.
16. Automobile craze.
2. Concerted attack on motor industry.
2. Monopoly and special privileges.
4. Lack of confidence in Washington.
2. General dissatisfaction with new tariff law.
12. High wages and high cost of living.
7. Labor unions and unsettled labor conditions.
3. Shortage of reliable labor.
2. Strikes.
2. Personal extravagance.
4. Present small stocks in users' hands.
2. Competition from people that don't know their true costs.
3. Unsettled financial conditions.
2. Poor bond market.
4. Uneasiness among Eastern bankers.
3. Shortage of money and tight money markets.
4. Speculation in iron by dealers and users.
3. Manner in which iron is sold.
2. Lack of competition in iron ore.

The replies to Question No. 2, "What remedy do you suggest?" were not as numerous and are shown under the following heads:

18. Good crops.
170. Cut down production.
24. Less political agitation against railroads.
12. Keep politics out of business.
8. Less interference with business by the Government.
5. Revise tariff downward.
8. Cut out speculative purchases.
4. Change system of selling iron.
3. Sell iron for nearby delivery only.
2. Sell iron for a season ahead.
5. Less trade unionism.
2. Open shops.
2. Cut out Wall Street influence.
2. Send business men, not politicians, to Washington.
3. Readjustment of cost of labor, material, food and clothing.
2. More trust busting.
4. Less trust busting.
2. General economy.
3. Stay on the job.
109. Wait.
40. Time and patience.

Tabulating replies to Question No. 3, "Is your general business as good as it was at this time in 1907?" and Question No. 4, "Are you melting as much iron as you were then?" we find:

159. Business the same.
202. Business better.
174. Business worse.

We find the average increase reported, 27.5 per cent.; average decrease reported, 29.2 per cent. As there are a greater number showing increases than decreases, we find that the total net increase is 1.2 per cent.

We have also classified the replies according to the several lines represented and give below summary of reports:

	Same.	More.	Less.	Total.
Machinery and specialties	40	43	44	127
Engines and boilers, pumps, &c.	11	16	15	42
Stoves, ranges and hollow ware	17	29	19	65
Agricultural implements, plows, &c.	19	31	13	63
Cast iron, water and gas pipes	3	3	0	6
Railroad equipment	7	0	3	10
Soil pipe, sanitary ware and building material	13	12	6	31
Steel castings	3	5	3	11
Jobbing and general foundries	30	51	56	137
Steel works, rolling mills, &c.	11	4	8	23
Malleable iron works	5	8	7	20
Totals	159	202	174	535

Pig Iron Stocks at Steel Works

In the editorial in *The Iron Age* of August 11, page 298, on "Pig Iron Stock Statistics and Their Value," the statement was made that "the figures of stocks at steel works furnaces were never collected even in the days of publicity." What was in mind was that the monthly statistics of pig iron stocks published by *The Iron Age* up to the fall of 1905 did not take account of steel works stocks. It should be said, however, that the pig iron stock statistics collected by the American Iron and Steel Association for 30 years preceding 1905 did take account of certain stocks at steel works furnaces. These statistics, which were published annually and for most of the time semiannually, included such stocks of pig iron in the hands of steel companies as were not intended for their own consumption—that is, stocks which these companies expected to sell in the market. In more recent years, as is well known, the steel companies have had very little iron to sell, and the foundry iron produced at Bay View, Wis., at a few furnaces owned by Central Pennsylvania companies, and at the Bessemer, Ala., furnaces of the Tennessee Coal, Iron & Railroad Company has been an insignificant percentage of the total product of the companies in question. The important points in the matter are that the steel companies' stocks of steel making iron for their own use have never been published, and that in recent years the steel making pig iron production of these companies has grown to be more than two-thirds the country's pig iron total.

The business and manufacturing property of the late Henry E. Pridmore, manufacturer of molding machines, Chicago, has been disposed of in court by the trustees of the estate. Mrs. Emily M. Pridmore, widow of the deceased, and her son, Henry A., are the purchasers. Mrs. Pridmore has assumed active charge of the company. This transaction affects the disposition of that portion of the Pridmore estate which was involved in the conduct of the business by the trustees.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Aug.17, 1910.	Aug.10, 1910.	July20, 1910.	Aug.18, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	*$16.00*	$16.00	$16.25	$17.25
Foundry No. 2, Southern, Cincinnati	*14.25*	14.25	14.75	16.25
Foundry No. 2, local, Chicago	16.50	16.50	16.50	17.00
Basic, delivered, eastern Pa.	*15.00*	15.25	15.75	17.25
Basic, Valley furnace	*14.00*	14.25	14.50	15.25
Bessemer, Pittsburgh	*16.15*	16.15	16.40	16.90
Gray forge, Pittsburgh	*14.25*	14.40	14.40	15.15
Lake Superior charcoal, Chicago	18.50	18.50	18.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	*24.50*	24.50	25.00	24.00
Forging billets, Pittsburgh	30.00	30.00	30.00	28.00
Open hearth billets, Philadelphia	*27.50*	27.50	28.50	27.00
Wire rods, Pittsburgh	*28.00*	28.00	29.00	31.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	**13.50**	13.50	13.00	16.00
Steel rails, melting, Philadelphia	*13.75*	13.75	14.00	17.00
Iron rails, Chicago	*16.00*	16.50	16.75	18.50
Iron rails, Philadelphia	*18.00*	18.00	18.50	19.75
Car wheels, Chicago	*14.50*	14.50	14.75	16.00
Car wheels, Philadelphia	14.00	14.00	14.00	16.00
Heavy steel scrap, Pittsburgh	*14.25*	14.25	14.50	16.50
Heavy steel scrap, Chicago	12.25	12.25	12.25	15.00
Heavy steel scrap, Philadelphia	*13.75*	13.75	14.00	17.00
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents	Cents.
Refined iron bars, Philadelphia	*1.42½*	1.42½	1.45	1.45
Common iron bars, Chicago	1.40	1.40	1.40	1.40
Common iron bars, Pittsburgh	*1.45*	1.45	1.50	1.50
Steel bars, tidewater, New York	*1.56*	1.56	1.61	1.51
Steel bars, Pittsburgh	*1.40*	1.40	1.45	1.35
Tank plates, tidewater, New York	1.56	1.56	1.56	1.56
Tank plates, Pittsburgh	1.40	1.40	1.40	1.40
Beams, tidewater, New York	1.56	1.56	1.56	1.56
Beams, Pittsburgh	1.40	1.40	1.40	1.40
Angles, tidewater, New York	1.56	1.56	1.56	1.56
Angles, Pittsburgh	1.40	1.40	1.40	1.40
Skelp, grooved steel, Pittsburgh	1.50	1.50	1.50	1.35
Skelp, sheared steel, Pittsburgh	1.60	1.60	1.60	1.45
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	*2.20*	2.20	2.30	2.20
Wire nails, Pittsburgh*	1.70	1.70	1.70	1.80
Cut nails, Pittsburgh	1.65	1.65	1.65	1.75
Barb wire, galv., Pittsburgh*	2.00	2.00	2.00	2.10
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	**13.00**	13.00	12.62½	13.62½
Electrolytic copper, New York	**12.62½**	12.62½	12.25	13.25
Spelter, New York	5.20	5.20	5.20	5.75
Spelter, St. Louis	5.05	5.05	5.05	5.60
Lead, New York	4.40	4.40	4.40	4.37½
Lead, St. Louis	**4.30**	4.30	4.25	4.25
Tin, New York	**33.85**	33.37	33.25	30.02½
Antimony, Hallett, New York	*7.95*	8.00	8.00	8.12
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.84	$3.84	$3.84	$3.64

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c. net; I-beams over 15 in., 1.50c. to 1.55c. net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c. net; angles over 6 in., 1.50c. to 1.55c. net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.45c. plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.40c. to 1.45c. net; zees, 3 in. and up, 1.40c. to 1.45c. net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c. net; hand rail tees, 2.50c. net; checkered and corrugated plates, 2.50c. net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Black annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 and 21, 2.05c.; Nos. 22 to 24, 2.10c.; Nos. 25 and 26, 2.15c. to 2.20c.; No. 27, 2.15c. to 2.20c.; No. 28, 2.20c. to 2.25c.; No. 29, 2.25c. to 2.30c.; No. 30, 2.35c. to 2.40c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.55c.; Nos. 17 to 21, 2.70c.; Nos. 22 to 24, 2.85c.; Nos. 25 and 26, 3c. to 3.05c.; No. 27, 3.10c. to 3.15c.; No. 28, 3.30c. to 3.35c.; No. 29, 3.45c. to 3.50c.; No. 30, 3.65c. to 3.70c. Painted roofing sheets, No. 28, $1.65 per square. Galvanized roofing sheets, No. 28, $3 per square, for 2½-in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe now in effect:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛ and ¼ in.	70	54	66	..
⅜ in.	71	57	67	53
½ in.	74	62	70	58
¾ to 6 in.	78	68	74	64
7 to 12 in.	72	57	68	53
Plugged and Reamed.				
1 to 4 in.	76	66	72	62
Extra Strong, Plain Ends.				
⅛ to ⅜ in.	63	51	59	47
½ to 4 in.	70	58	66	54
4½ to 8 in.	66	54	62	50
9, 10, 11 and 12 in.	54	42	..	..
Double Extra Strong, Plain Ends.				
½ to 8 in.	59	48	55	44

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1¾ to 2¼ in.	61	43
2½ in.	63	48
2¾ to 5 in.	69	55
6 to 13 in.	61	43

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer rods, $28 to $28.50; open hearth and chain rods, $28.50 to $29.

Steel Rivets.—Structural rivets, ¾-in. and larger, 2.15c., base; cone head boiler rivets, ¾-in. and larger, 2.25c., base; ⅝-in. and 11-16-in. take an advance of 15c., and ½-in. and 9-16-in. take an advance of 50c.; in lengths shorter than 1-in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

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Pittsburgh

PARK BUILDING, August 17, 1910.—(*By Telegraph.*)

Pig Iron.—No important transactions in Bessemer are reported, and the market remains quotable at $15.25, Valley furnace. A sale was made of 1000 tons with a particular analysis, for which a premium of 25c. was paid, making the price $15.50. Another sale of 800 tons, September to December, inclusive, was made to a steel casting company under special conditions. A sale of 1000 tons of basic was made to a consumer for early delivery at $14, Valley furnace. Several sales of forge have been made at prices under those lately quoted, the most important being 5000 tons to a Pittsburgh consumer for delivery over the remainder of the year at $13.35, Valley furnace, or $14.25, Pittsburgh. One of the two Hubbard furnaces will blow out this month for relining, the other remaining in blast indefinitely. We quote at Valley furnaces, 90c. higher delivered Pittsburgh: Bessemer, $15.25; basic, $14; gray forge, $13.35 to $13.50; No. 2 foundry, $14.25; malleable, Bessemer, $14.50.

Steel.—Makers report a slightly better inquiry for billets and steel bars, but actual sales have been light and minimum prices are not quotably changed. We quote, f.o.b. maker's mill Pittsburg, Wheeling or Youngstown districts: Bessemer billets, $24.50; Bessemer sheet bars, $25.50; open hearth sheet bars, $26.50 to $27; forging billets, $30.

Wrought Pipe.—No important line pipe business has been placed, but a large aggregate of small inquiries is being figured on. Because of the continued idleness of a majority of the puddling furnaces iron pipe has become relatively scarce. Prices are absolutely maintained. One producing interest has practically withdrawn its quotation, while another producer has been inquiring for muck bar in the open market.

(*By Mail.*)

On the whole the iron and steel market is still phenomenally dull, but slight evidences of improvement are noted here and there. Thus a large steel interest finds its specifications and new orders so far this month make a slightly larger total than in the same portion of July. The tone of the market appears slightly better, prices not yielding to the dullness as might be expected. The most striking feature of the situation is obviously the large tonnage of material which is moving from furnace and mill to consumer, despite the market stagnation; while production has shown a slight further decrease since the beginning of the month, for months past the trade has been surprised at the way in which the tonnage keeps up. Buying, of course, is only from hand to mouth, and even in wire products, where the tonnage on books had dropped to a minimum, there is scarcely any buying for the fall trade, although buying for current requirements makes a fair total weekly. Some hopes are expressed that the progress being made in rate adjustments, whereby the railroads will be allowed to make some advances, will result in heavier orders in the near future, but these hopes are not general, the usual opinion being that little buying can be expected from the railroads until after the elections. In cars the railroads are still due to absorb a large tonnage of steel this year, as the two leading car builders are understood each to have about 10,000 cars on their books, sufficient to maintain full operations at 100 cars each daily until the end of the year. The Pittsburgh Steel Company on Saturday closed its steel and wire plant at Monessen for repairs, to open September 1. The plant was closed June 30 with the expectation of being down during July, but started after a few days. The wage matter between the independent puddling interests and the United Sons of Vulcan has not been settled. The Amalgamated Association has not adopted any fresh policies following the per capita vote to continue the strike against the leading sheet and tin plate interest, and this situation presents no new features nor any that are of interest to the market.

Ferromanganese.—Inquiry continues light and prices are maintained at the previous level, $39 to $39.50, Baltimore, for prompt delivery.

Ferrosilicon.—While the inquiry continues fairly good, transactions are not heavy. We quote 50 per cent. ferrosilicon at $57.50 to $58, delivered, Pittsburgh, and blast furnace ferrosilicon as follows: $23 for 10 per cent., $24 for 11 per cent. and $25 for 12 per cent., f.o.b. Jisco and Ashland furnaces.

Rods.—With little inquiry, prices are unchanged, at $28 to $28.50 for Bessemer and $28.50 to $29 for open hearth, Pittsburgh.

Skelp.—New buying in skelp is limited, and quoted prices are not severely tested. Specifications are fairly good and a large tonnage is moving on old contracts. We quote for ordinary widths and gauges: Grooved steel skelp, 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp, 1.80c.; sheared iron skelp, 1.90c., all f.o.b. mill, Pittsburgh.

Steel Rails.—Buying is restricted and the rail market presents no interesting features. We quote standard sections of Bessemer rails at $28, mill, and light rails as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, Pittsburgh. We quote steel axles at 1.75c. to 1.80c. and splice bars at 1.50c., at mill.

Structural Material.—New business continues of small volume and prices on fabricated material hardly let the fabricator out, when paying 1.40c. for plain shapes. The shops are fairly busy with work which will keep them two or three months. We quote beams and channels, 15-in. and under, at 1.40c. to 1.45c., Pittsburgh.

Plates.—As noted above, the two largest steel car builders are practically filled with work to the end of the year, while the smaller interests have a fair amount of business on books, so that plate deliveries to this class of consumers promise to be well maintained. As much cannot be said of the lake shipbuilding trade, prospects in which are poor because with the largest freight movement on record many boats are tied up. Mills making a full range of sizes maintain 1.40c. as a minimum quotation, and occasionally obtain 1.45c. on less desirable business, while occasionally small mills making only a limited range of sizes cut the 1.40c. price by 50c. or $1 a ton.

Sheets.—The shading on galvanized sheets has increased slightly in the past week or 10 days, and in most cases reaches $5 a ton, making galvanized sheets 3.25c., while black sheets are quotable regularly at 2.25c., or $3 a ton off the nominal price, although 2.20c. is occasionally done. Corresponding shading is done on corrugated material, nominal prices for which are $1.70 a square on painted and $3 a square on galvanized, 28 gauge.

Tin Plate.—While the general per capita vote of the Amalgamated Association, announced last week, was in favor of continuing the strike against the leading sheet and tin plate interest, the vote at the La Belle tin plate plant at Wheeling was in favor of calling it off, the Aetna-Standard sheet plant and the Martins Ferry tin plate plant, the other two of the three Wheeling district plants which are idle, being in favor of continuing it. Mills continue behind in tin plate deliveries, although there is relatively little new business, and the present production rate promises to continue indefinitely, as all producers are booked far ahead. The market is absolutely firm at the regular price of $3.60, Pittsburgh, for 100-lb. cokes, premiums up to 15c. per box being sometimes paid for small lots for quick shipment.

Bars.—New business in both steel and iron bars is extremely light, but specifications continued good on steel bar contracts. The mills continue to maintain 1.40c. as the absolute minimum on steel bars, and on less desirable business frequently obtain 1.45c., while one important producer just east of Pittsburgh is maintaining 1.45c. as a minimum. We continue to quote iron bars at 1.45c. to 1.50c., Pittsburgh. There is practically no puddling being done in the Pittsburgh district on account of the scale disagreement with the Sons of Vulcan, but some finishing departments in the mills are running. The valley and other iron mills of the Republic Iron & Steel Company are running, but not at full capacity.

Spelter.—The market has stiffened by producers marking up prices, although demand has been relatively light. We quote 5.12½c., East St. Louis, or 5.25c., delivered, Pittsburgh.

Hoops and Bands.—The leading interest is operating practically all its hoop mills, chiefly on old business, new buying being comparatively light. We quote hoops at 1.50c. to 1.55c., and bands at 1.45c. to 1.50c., the latter with extras on the steel bar card.

Spikes.—The new demand for spikes is light, and, while old contracts have been well specified against right along, there is not a great deal of this business left. We quote standard sizes of railroad spikes at 1.50c. to 1.55c. for Western shipment and 1.55c. to 1.60c. for local trade. Some producers refuse to go below 1.55c. on any business, but on really attractive business it is not certain that even 1.50c. would not be shaded by some producers. We quote small railroad and boat spikes at 1.60c. to 1.65c., base, for carload and larger lots.

Rivets.—Very little new business is being placed. Official prices, which are sometimes shaded on desirable business, remain at 2.15c. for structural rivets and 2.25c. for boiler rivets, f.o.b. Pittsburgh.

Shafting.—Specifications on old contracts for shafting continue good, except from the automobile trade, while new business is light. Regular discounts on shafting are 55 per cent. off list in carload and larger lots and 50 per cent. off

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in small lots, delivered in base territory. For desirable specifications the carload price of 55 per cent. off is sometimes shaded by an additional 5 per cent.

Wire Products.—Buying of plain and barb wire and nails is fairly good, but represents only the meeting of immediate requirements, there being very little ordering for the regular fall trade. We quote galvanized barb wire at $2; painted, $1.70; annealed fence wire, $1.50; galvanized, $1.80; wire nails, $1.70, and cut nails, $1.65 to $1.70, in carload and larger lots, all f.o.b. Pittsburgh, freight to destination being added.

Merchant Pipe.—Since the large orders for line pipe, recently placed, little has been done in this grade, and merchant pipe is also slow, as some of the jobbers still have considerable stocks. The mills are holding prices very firm on merchant steel pipe, while wrought iron pipe discounts are fairly well maintained.

Boiler Tubes.—The demand for boiler tubes has shown a slight decrease in the past week or two, and regular discounts continue to be shaded.

Coke.—The new demand for coke has been light. Contracting for foundry coke has fallen off, and there is no interest in furnace coke contracts. Small prompt lots continue to command full prices, there being little coke pressing on the market. Production and consumption appear to be well balanced. The Connellsville *Courier* reports the weekly production at 406,505 tons, a decrease of 3000 tons from the previous week. The average since May 1 has been about 400,000 tons weekly. We quote standard grades of Connellsville coke at $1.65 to $1.70 per net ton, at oven, for prompt furnace, $1.75 to $1.85 for contract furnace, $2.15 to $2.25 for prompt foundry and $2.25 to $2.50 for contract foundry.

Iron and Steel Scrap.—It is understood that very little heavy melting steel was due at Monessen when the largest plant at that point shut down last Saturday, and its closing until September 1 will hardly bear the market. Very little is being done in the scrap market, and we quote prices substantially unchanged, as follows, per gross ton, Pittsburgh:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$14.25 to $14.50
No. 1 foundry cast	14.00 to 14.25
No. 2 foundry cast	13.00 to 13.25
Bundled sheet scrap, at point of shipment	9.75 to 10.00
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	15.75 to 16.00
No. 1 railroad malleable scrap	13.75 to 14.00
Grate bars	10.75 to 11.00
Low phosphorus melting stock	18.00 to 18.50
Iron car axles	21.00 to 21.50
Steel car axles	19.00 to 19.50
Locomotive axles	25.00 to 25.50
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	14.00 to 14.50
Sheet bar crop ends	16.00 to 16.25
Cast iron borings	7.50 to 7.75
Machine shop turnings	9.25 to 9.50

The Whitney-Kemmerer Company, Oliver Building, Pittsburgh, has been appointed sales agent for Pittsburgh and vicinity by the Dunlap-Connellsville Coke Company, Connellsville, Pa.

Chicago

FISHER BUILDING, August 17, 1910.—(*By Telegraph.*)

There is little improvement in the tone of the Chicago market this week. While there is not much increase in the volume of business, there is a general feeling that conditions have improved somewhat. Unfavorable crop reports have ceased and recent rains throughout the West have improved the prospects for corn and pasture. The railroads are buying more material and supplies. Their orders generally specify small lots, but purchasing agents are unusually urgent in requesting immediate deliveries. As the mills cannot always give immediate shipment, an unusual amount of railroad material is being purchased from store. While the business of this character does not reach any large figures in quantity, the character of the buying is taken as an indication that railroad storekeepers' stocks are very low and that the railroads will be compelled to buy more liberally in the near future. An unusual run of specifications for plate girder bridges is helping out the plate mills, and the tone of the market in structural shapes is a little better. Some of the mills continue to get business at 1.45c., Pittsburgh, for soft steel bars, and it is understood in this market that the 1.40c. price is only done on very desirable business. The demand for concrete bars is becoming a still more important factor in the bar trade, and the bar iron mills are profiting by an increased demand from the railroads. New business in wire products is apparently coming in at a normal rate for the season. Shipments of merchant steel into this territory from the East continue heavy and are very near record figures. Sales from store last week showed a satisfactory average, the business being well distributed in all lines of material thus carried. One of the favorable indications in the market is that dealers in old material are beginning to express the opinion that prices have reached the bottom. This opinion is encouraged by the fact that several railroads which usually sell their scrap each month are now holding it for higher prices. There is a fair demand for copper and other metals.

Pig Iron.—The market continues very quiet. Actual sales are rare in both Northern and Southern grades, and requests to hold back shipments are becoming more troublesome to the furnaces. Buyers generally insist that they are covered for the remainder of the year and will not be in the market until they can buy for the first half of 1911. The local furnaces are holding for $16, at furnace, as their minimum price, equal to $16.50 for the average Chicago delivery, with switching charges paid. Stocks, however, are accumulating at the furnaces and there have been sales of off-grade iron from stock on which special prices have been allowed, giving rise to a great deal of talk that lower prices are being made than regular quotations. One sale of 2000 tons of malleable Bessemer is noted to a local malleable foundry for delivery during the remainder of the year, and a sale of 1500 tons of Northern foundry has also been made for early delivery. A Chicago buyer is in the market for a bargain in a round lot of silvery iron, the amount to be taken depending upon the price that can be done. Current quotations are maintained on small lots of high silicon iron, but it is understood that special prices are made on any inquiry for a round lot. The recent reduction in the recognized price of Southern iron has had no effect on buyers, who are showing no interest in the market except to make tentative inquiries for next year's delivery. A leading interest identified chiefly with Southern iron has made a careful canvass recently among foundry buyers to obtain their opinions of the market and data regarding any increase or decrease in the melt. More than half the replies in this territory show that the foundries are doing a larger business than at this time in 1907, while less than one-fourth report an actual decrease in their melt. Overproduction of foundry iron is considered by the majority as the reason for the depressed state of the market. The following quotations are for August and September shipment, Chicago delivery:

Lake Superior charcoal	$18.50 to $19.00
Northern coke foundry, No. 1	17.00 to 17.50
Northern coke foundry, No. 2	16.50 to 17.00
Northern coke foundry, No. 3	16.25 to 16.50
Northern Scotch, No. 1	17.50 to 18.00
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	16.50 to 17.00
Standard Bessemer	17.65 to 18.15
Jackson Co. and Kentucky silvery, 6%	19.40 to 19.90
Jackson Co. and Kentucky silvery, 8%	20.40 to 20.90
Jackson Co. and Kentucky silvery, 10%	21.40 to 21.90

(*By Mail.*)

Billets.—The market is relatively quiet at $29 to $30, base, Chicago, for open hearth forging billets.

Rails and Track Supplies.—No new business in standard rails is reported, but the railroads are taking full deliveries on their contracts for 1910. Spikes and track supplies are still in fair demand, but Western roads have generally covered their requirements for this summer. We quote standard railroad spikes at 1.70c. to 1.80c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., $26; 30 to 35 lb., $26.75; 16, 20 and 25 lb., $27; 12 lb., $28, Chicago.

Structural Material.—Evidence of returning confidence in business conditions is found in the fact that Mandel Brothers of this city have decided to go forward promptly with plans for erecting their new department store building. The contract for this building, amounting to about 10,000 tons, was let last winter, but detailed specifications have been held back until recently. The Atchison, Topeka & Santa Fe Railroad has given the American Bridge Company a contract for 1350 tons of bridges. Additional smelter construction for the Utah Copper Company, amounting to 460 tons, which was reported last week, has been relet to the Kansas Structural Steel Company. The fabricating interests have a large run of business in small highway bridges. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—The plate mills in this district had a good run of specifications last week, principally from fabricating interests for material going into plate girders. No new car orders or inquiries are reported, and there is some doubt whether the Chicago & Alton will close promptly on inquiries which have been pending with the car builders for

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some time. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—There is a fair run of new business in open hearth sheets, with prices varying according to the tonnage purchased. The Inland Steel Company tried out one of its new open hearth furnaces last week, and will have the second ready for operation within a few days, thus assuring a larger supply of steel to operate its mills. We quote as follows, Chicago: No. 10 annealed, 1.93c.; No. 28 black, 2.43c.; No. 28 galvanized, 3.48c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.20c. to 2.30c.; No. 28 black, 2.85c. to 2.95c.; No. 28 galvanized, 3.90c. to 4c.

Cast Iron Pipe.—There is a very brisk demand from municipalities for small lots of water pipe for delivery this fall. The season is growing short in the northern half of the country for pipe to be laid this year, and this has apparently stimulated the current demand. The foundry interests are now looking forward to lettings of larger lots for shipment during the winter, but no important business of this character has been closed as yet. It is believed that a turn in the iron market would have considerable influence in hastening purchases for next year's delivery. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $27.50; 6 to 12 in., $26.50; 16-in. and up, $25.50, with $1 extra for gas pipe.

Merchant Steel.—Manufacturers who use merchant steel are generally specifying at a normal rate, and shipments into this territory are running heavy. It is understood that in some cases automobile manufacturers are contracting for less material than they bought last year, the curtailment in a few cases amounting to 50 per cent., but, on the other hand, many of them are specifying for just as much material as they took last year at this season. The demand from store for all merchant steel products continues good. The railroads are buying a considerable amount of merchant mill products from store, in small orders for immediate delivery.

Old Material.—The market continues very quiet, with no change noted in prices this week except that old iron rails are quoted 50c. lower. There is a little better feeling among dealers, however, and they are very reluctant to sell short at the present level of prices. The principal lines of scrap are quoted lower now than at any time in several years, except the first half of 1908 and a short period in the spring of 1909. Last year at this time the railroads were very active in buying equipment and supplies, but their purchases have been light for the past two months, and the rolling mills and foundry buyers of scrap have been correspondingly reluctant to stock up with old material. Dealers also are carrying very light stocks at present in the Chicago district, so that any increase in the demand would be quickly felt in establishing higher prices. Several railroads which usually issue monthly lists are holding back their material in the expectation of obtaining higher prices in the near future. While there is a slight improvement in the feeling in the market, this is not reflected in current prices. One lot of rerolling rails was sold last week at $15, delivered at buyer's mill, the lowest price noted in this market since a year ago in May. This, however, was a distress sale, and the average going price is a little higher. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Factories which sell scrap usually receive 50c. to $1 less. Following prices are per gross ton, delivered, Chicago:

Old iron rails	$16.00 to $16.50
Old steel rails, rerolling	15.25 to 15.75
Old steel rails, less than 3 ft.	13.50 to 14.00
Relaying rails, standard sections, subject to inspection	24.00 to 25.00
Old car wheels	14.50 to 15.00
Heavy melting steel scrap	12.25 to 12.75
Frogs, switches and guards, cut apart	12.25 to 12.75
Shoveling steel	11.75 to 12.25

The following quotations are per net ton:

Iron angles and splice bars	$14.00 to $14.50
Iron car axles	19.50 to 20.00
Steel car axles	19.50 to 20.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
Springs, knuckles and couplers	11.50 to 12.00
Locomotive tires, smooth	17.00 to 17.50
No. 1 dealers' forge	10.50 to 11.00
Steel axle turnings	8.50 to 9.00
Machine shop turnings	7.00 to 7.50
Cast and mixed borings	4.75 to 5.25
No. 1 busheling	10.25 to 10.75
No. 2 busheling	8.00 to 8.50
No. 1 boilers, cut to sheets and rings	9.00 to 9.50
No. 1 cast scrap	12.75 to 13.25
Stove plate and light cast scrap	11.00 to 11.50
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.50 to 11.00
Pipes and flues	9.25 to 9.75

Rods and Wire.—The mill interests feel assured that stocks in the hands of jobbers and dealers were fully liquidated before the readjustment in prices last month. Buying is now on a consumptive basis, both in the manufacturing and jobbing trades. This season is expected to show the usual increase in the demand for fabricated fence. The barb wire business has been practically stationary for several years, and the annual increase in the product of the wire mills goes principally into field fence. New orders and specifications for August make a very satisfactory showing. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c., all Chicago.

Bars.—There is quite a run of new business in bars, especially for concrete work. The Great Northern Railway has an inquiry out for 1500 tons of bars for concrete tunnel work in the Cascade Mountains, and there have been several inquiries lately for lots of 500 to 1000 tons of concrete bars. The wagon and agricultural implement manufacturers have been specifying liberally for their fall trade, which is apparently very satisfactory. The railroads have been buying a little more bar iron lately, and their purchasing agents are very urgent in getting immediate delivery of the small lots which they specify, indicating that stocks are running low in their car shops and stores. We quote as follows: Soft steel bars, 1.58c. to 1.63c.; bar iron, 1.40c. to 1.45c.; hard steel bars rolled from old rails, 1.45c. to 1.55c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

The business of the Gordon Iron Company, Chicago Heights, Ill., dealers in scrap iron and metals, has been incorporated with a capital stock of $10,000. The company has recently purchased a new yard with a trackage capacity of 20 cars, which it has equipped to handle everything in scrap iron and metals. It will also continue the operation of its old yards.

Philadelphia

PHILADELPHIA, PA., August 16, 1910.

A somewhat better feeling is observed in the various branches of the iron and steel trades. This is not due to any increased activity in buying, as transactions during the week have been extremely light, but rather to increasing interest on the part of consumers, who are beginning to feel round more actively for requirements during the remainder of the year and in some cases for early 1911 delivery. This is particularly the case with pig iron, prices for which are believed to be touching bottom. In finished materials the market drifts along without much change. Orders are still confined principally to small lots, with a fair volume of larger business still unplaced, consumers hoping for further concessions. In the majority of instances, however, makers are inclined to hold the present price level more firmly, although on sharp competition for desirable orders slight shading is reported. The old material market continues dull and there has been little movement in coke.

Pig Iron.—As far as actual sales are concerned, business shows no improvement. There is, however, a decidedly more hopeful feeling, and sellers anticipate a more active movement in the near future. Some consumers have come into the market for fair sized lots for early as well as forward delivery, but sellers are not particularly anxious to load up their books with low priced business and show a disposition to hold quotations more firmly. The cast iron pipe makers in this territory would place orders for probably 30,000 tons of low grade iron if their ideas of prices, ranging from 25c. to 50c. below the market, would be met; but producers have shown no inclination to meet their views. Inquiries for lots of several thousand tons of the higher grades of foundry iron have been reported, while the usual small lot demand continues about the average. That consumption is well maintained is being evidenced, sellers contend, by the fact that melters are taking deliveries freely, particularly in the foundry grades. Transactions in the standard eastern Pennsylvania brands of foundry iron have been confined to small lots, at prices ranging from $16 to $16.25, delivered, for No. 2 X foundry, with an occasional sale at $16.50. A sale of a moderate lot of soil pipe iron at $15, delivered in this district, is reported. Some sales of Virginia foundry iron at $13.25 to $13.50, furnace, for No. 2 X, are reported, this price being equivalent to $16 to $16.50, delivered in this district, dependent on delivery point. A sale of 2000 tons of off Virginia basic to a cast iron pipe works in that territory is reported. A minimum differential of 25c. a ton is maintained by producers of Northern irons, between No. 2 X and No. 2 plain grades, although some Virginia sellers make no differential between those grades at the lower price level. There has been some movement in forge iron. Several sales of 500-ton lots, for comparatively early delivery, have been made to rolling mills in this territory at $15, delivered. A small lot of Virginia forge was also sold to a buyer in eastern Pennsylvania at the same figure. Steel making grades show absolutely no movement. Basic iron is practically uncalled for and is nominally quoted

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at $15.25, delivered, although $15 could be done. One small consumer has been feeling the market, offering to purchase a small lot at 50c. under the market, but the inquiry is not being taken seriously. No sales of standard low phosphorus iron are reported. The following range about represents the market for standard brands, in moderate lots, for early delivery in buyers' yards, eastern Pennsylvania and nearby points:

Eastern Pennsylvania, No. 2 X foundry	$16.00 to $16.25
Eastern Pennsylvania, No. 2 plain	15.75 to 16.00
Virginia, No. 2 X foundry	16.00 to 16.50
Virginia, No. 2 plain	16.00 to 16.25
Gray forge	15.00 to 15.25
Basic	15.00 to 15.25
Standard low phosphorus	22.50 to 22.75

Ferromanganese.—The market is extremely quiet, no demand being reported from consumers either in this territory or in the West. Prices are entirely nominal, but sellers' ideas range from $39, Baltimore, for prompt, to $40 for extended delivery. A number of sellers hold at still higher figures.

Billets.—Business during the week has been largely of a day to day character, confined to small lots for early delivery, consumers as a rule not being inclined to buy ahead. For miscellaneous business $27.50 to $28, delivered in this territory, about represents the market for ordinary open hearth rolling billets, although a concession of 50c. a ton could be had for moderate lots. Forging billets are being more freely inquired for and prices are firm at $29.50 to $30, Eastern mill, the usual extras applying for high carbons and special sizes.

Plates.—A fairly even demand for small lots is reported, and while incoming orders and specifications are sufficient in some cases to enable mills to maintain an even productive basis, other mills are understood to be in need of tonnage. Large inquiries are scarce, although there is some fair business in tank and structural plates still under negotiation. For the general run of miscellaneous business 1.55c., delivered in this territory, represents the minimum quotation, although 1.60c., delivered, is in instances obtained.

Structural Material.—While the bulk of the business has been confined to small lots, several building propositions requiring from 500 to 1200 tons of fabricated material are being figured upon. The additions to the Union League, St. James Hotel and the St. Charles Hotel at Atlantic City, with aggregate requirements close to 3000 tons, are expected to be closed at an early date. Several other good propositons are in sight, but develop slowly. Current orders have been small, at prices ranging from 1.55c. to 1.60c. for plain shapes, delivered in this territory.

Sheets.—The demand is somewhat irregular. Some producers are receiving day to day orders for small quantities, which in the aggregate enable mills to operate at practically full capacity, but other makers are not so well fixed, and in all cases the amount of forward business on the books is small. For ordinary business for prompt delivery prices are unchanged, although concessions of $1 a ton could be had for tonnage. Quotations of Eastern manufacturers range as follows: Nos. 18 to 20, 2.70c.; Nos. 22 to 24, 2.80c.; Nos. 25 and 26, 2.90c.; No. 27, 3c.; No. 28, 3.10c.

Bars.—While there is still some demand for refined iron bars, it is not as active as it was last week. A few orders have been placed, but the demand does not seem as urgent. Prices are not strong, and while 1.42½c. to 1.52½c. about represents the market for refined iron bars delivered in this territory, the inside figure might be shaded for desirable specifications. Efforts have been made to interest Eastern mills in an association formed on the lines of the old Eastern Bar Iron Association, but as far as can be learned they have been unsuccessful. Steel bars are being firmly held at 1.55c. to 1.60c., delivered in this vicinity.

Coke.—Business transacted has not been very heavy. A few moderate contracts for foundry coke for remainder of the year delivery, as well as for early shipment, at $2.25 to $2.50 per net ton, at oven, have been reported, and the market is firm at those figures. Furnace coke continues inactive at $1.65 to $1.85, at oven. A number of the producers are now pretty well sold up and forced sales are less frequent. The following range about represents the quotations per net ton, delivered in buyers' yards in this vicinity:

Connellsville furnace coke	$4.00 to $4.15
Foundry coke	4.50 to 4.75
Mountain furnace coke	3.60 to 3.75
Foundry coke	4.10 to 4.35

Old Material.—Neither consumers nor dealers show any special interest in the market. Sellers show no disposition to force sales, to do which would mean lower prices, while consumers take occasional cheap lots, but being well supplied make no efforts to purchase any considerable quantities. The buyer for the associated steel mills and rolling mills in this territory is not taking on any very heavy tonnages. No. 1 railroad wrought and machinery cast are a shade lower. The following range about represents the market for delivery in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia of 45c. to $1.30 per gross ton:

No. 1 steel scrap and crops	$13.75 to $14.00
Old steel rails, rerolling	15.50 to 16.00
Low phosphorus	19.00 to 19.50
Old steel axles	20.00 to 20.50*
Old iron axles	26.50 to 27.50*
Old iron rails	18.00 to 18.50
Old car wheels	14.00 to 14.50
No. 1 railroad wrought	15.00 to 15.50
Wrought iron pipe	13.50 to 14.00
No. 1 forge fire	12.00 to 12.50
No. 2 light iron	7.50 to 8.00
Wrought turnings	8.75 to 9.25
Cast borings	9.25 to 9.75
Machinery cast	14.00 to 14.50
Railroad malleable	13.50 to 14.00
Grate bars	11.50 to 12.00
Stove plate	10.00 to 10.50

* Nominal.

The Richard Heckscher & Sons Company, the Swede furnace department of the Alan Wood Iron & Steel Company, will remove its offices September 5 from the Manhattan Building, Fourth and Walnut streets, to the new quarters of the Alan Wood Iron & Steel Company, on the fifteenth floor of the Morris Building.

Cincinnati

CINCINNATI, OHIO, August 17, 1910.—(*By Telegraph.*)

Pig Iron.—A number of inquiries are now coming in for deliveries the remainder of this year and the first quarter of next, but actual business is very slow in developing. A local firm is understood to have closed for several hundred tons of Southern iron, based on a price of $11.50, Birmingham, for shipment the first half of next year, but this does not represent the market price for that delivery, as practically all the furnace interests are holding out strong for something better. For delivery through the remainder of this year $11.50 is quoted, but for prompt shipment it is understood that $11 can be done with some Tennessee furnaces. It is the general opinion that the market is about at the turning point and that better figures should soon prevail. For speculative purposes an Ohio firm is reported to have made an offer to take about 4000 tons of Southern iron at $10.75, but it has not yet been able to place the order at that figure. Northern irons are still dull and $14.50 to $15, Ironton, for last half shipment are average quotations. Malleable is around $14.75, with very little moving. The Belfont Furnace in the Ironton district goes out of blast this week for repairs. For immediate delivery and for the remainder of the year, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry	$14.75 to $15.25
Southern coke, No. 2 foundry	14.25 to 14.75
Southern coke, No. 3 foundry	13.75 to 14.25
Southern coke, No. 4 foundry	13.50 to 14.00
Southern coke, No. 1 soft	14.75 to 15.25
Southern coke, No. 2 soft	14.25 to 14.75
Southern gray forge	13.50 to 14.00
Ohio silvery, 8 per cent. silicon	19.20
Lake Superior coke, No. 1	16.20 to 16.70
Lake Superior coke, No. 2	15.70 to 16.20
Lake Superior coke, No. 3	15.20 to 15.70
Standard Southern car wheel	25.25 to 25.75
Lake Superior car wheel	22.25 to 22.75

(*By Mail.*)

Coke.—A contract was closed last week by a local firm covering a 12 months' supply of Wise County furnace coke, which is understood will be shipped to a Western concern. The tonnage involved makes this one of the best orders booked lately in this section, and it is stated that the regular market price was maintained. Two inquiries were received from Eastern companies for a year's supply of furnace coke, calling for 7000 and 10,000 tons per month, respectively, and these also helped to enliven the market a little. Contract foundry coke continues to move freely, and there are a considerable number of small purchases being made to fill immediate requirements. Prices are unchanged, but appear to be even firmer than for last week. For Connellsville furnace coke we quote $1.70 to $1.85 per net ton, at oven, and for Pocahontas, furnace grades, $1.75 to $1.85. Connellsville, Pocahontas and Wise County foundry coke is quoted all the way from $2 to $2.25, but $2.10 would be about the figure at which business is being transacted.

Finished Iron and Steel.—About the only activity to be noted is in structural material from stock. The warehouse price of beams and channels remains at 1.90c. to 2c., and dealers are in position to make prompt shipment on almost any standard specifications. While the Pittsburgh mill price on steel bars is now conceded to be 1.40c., the warehouse figure is still 1.80c.

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Old Material.—The market continues very dull, both buyers and sellers waiting for something to happen to stimulate business in this line. Prices for delivery in buyers' yards, Cincinnati and southern Ohio, are as follows:

No. 1 railroad wrought, net ton	$12.50 to $13.00
Cast borings, net ton	4.50 to 5.00
Steel turnings, net ton	6.00 to 7.00
No. 1 cast scrap, net ton	11.50 to 12.50
Burnt scrap, net ton	8.00 to 9.00
Old iron axles, net ton	17.50 to 18.50
Old steel rails, gross ton	14.50 to 15.00
Relaying rails, 50 lb. and up, gross ton	22.50 to 23.50
Old car wheels, gross ton	12.00 to 13.00
Heavy melting steel scrap, gross ton	12.00 to 12.50

Cleveland

CLEVELAND, OHIO, August 16, 1910.

Iron Ore.—Shipments have fallen off considerably. Ore firms are anxious to get down all they have sold as early as possible, but a check in the movement in the past two weeks has resulted from the action of a number of furnace interests in refusing to take any more for the present. Docks are so crowded that boats are being delayed in disposing of cargoes not intended for direct shipment. Ore firms are not showing much interest in the offering of some odd lots of resale ore at price concessions, as these offerings will have no effect on regular prices. One Ohio furnace interest is reported to have an inquiry out for some Bessemer ore. We quote prices as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—The leading pipe interest is figuring on the purchase of a large tonnage of Nos. 3 and 4 foundry iron for the remainder of the year delivery. With this exception the market continues very dull. Few inquiries have come out and these are for small tonnages. Some consumers who have asked for prices in the past few weeks have decided not to buy for the present, and others have not yet placed their orders. We note the sale of 500 tons of No. 2 foundry to a northern Ohio furnace for the remainder of the year delivery at $14, Valley furnace, and a 100-ton lot at the same price. Few of the furnace interests care to meet the present low prices, and unless a change in conditions comes shortly two additional northern Ohio furnaces will probably be blown out. While the local market is as dead at present as it has been at any time in the past few months, a better feeling is expressed in some quarters, and an improvement is looked for next month. No. 2 foundry is quoted at $14, Valley furnace, but most producers are adhering to $14.25. For prompt shipment and for the remainder of the year we quote, delivered, Cleveland, as follows:

Bessemer	$16.15
Northern foundry, No. 1	$15.25 to 15.50
Northern foundry, No. 2	14.50 to 14.75
Northern foundry, No. 3	14.00 to 14.50
Gray forge	14.15 to 14.25
Southern foundry, No. 2	15.35 to 15.85
Jackson Co. silvery, 8 per cent. silicon	19.25 to 19.50

Coke.—While some small contracts for foundry grades are reported, the market is generally quiet. The only activity in furnace grades is an occasional sale of a small lot for prompt shipment. Prices on foundry grades are fairly firm. We quote standard Connellsville furnace coke at $1.55 to $1.65 per net ton, at oven, for prompt shipment, and $1.75 to $1.85 for the last half. Connellsville 72-hour foundry coke is held at $2.15 to $2.25 per net ton, at oven, for prompt shipment, and $2.25 to $2.50 for the last half.

Finished Iron and Steel.—Most mill agencies report some improvement in the volume of orders as compared with July, and the favorable crop reports have produced a better feeling among both producers anl consumers. While a decided change is not expected this month, considerable improvement in orders is looked for in September. Present orders are pretty evenly divided between specifications on contracts and current orders, nearly all being for small tonnages for immediate requirements. Prices generally are firm. Steel bars are being maintained at a minimum of 1.40c., Pittsburgh, for carload lots, but no quotations under 1.45c. are reported for less than carload lots. The demand for steel reinforcing bars continues quite active. There is a fair demand for small lots of plates, and although there are rumors of lower quotations the 1.40c. price appears to be quite firmly maintained in this market. The demand for structural material in small lots is fairly good and 1.40c. is being firmly maintained. No new work requiring large tonnages is coming out, but local fabricators are getting a good volume of small orders and their shops are still well filled with work. The demand for sheets continues quiet and prices show no improvement. We quote No. 28 sheets at 2.20c. for black and 3.25c. to 3.30c. for galvanized. The demand for iron bars continues only moderate. The usual quotation of 1.40c., at mill, can be shaded on a desirable order. The demand for shafting is holding up well. Very little business in any line is coming from the railroads. Warehouse business with the jobbers has improved somewhat during the past week.

Old Material.—The condition of the market shows practically no change. Buying by the mills is in only small lots for immediate needs. There is little demand from foundries. Prices are at about the same level that they were three weeks ago, when some activity caused a slight temporary advance. The Norfolk & Western Railroad will close August 18 on about its usual list. Dealers' prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$14.00 to $14.50
Old iron rails	16.00 to 16.50
Steel car axles	20.00 to 20.50
Heavy melting steel	13.00 to 13.50
Old car wheels	14.00 to 14.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.00 to 13.50
Light bundled sheet scrap	9.00 to 9.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	5.50 to 6.00
Iron and steel turnings and drillings	6.75 to 7.25
Steel axle turnings	9.00 to 9.50
No. 1 busheling	11.00 to 11.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 cast	11.50 to 12.00
Stove plate	10.50 to 11.00
Bundled tin scrap	11.00 to 11.50

St. Louis

ST. LOUIS, MO., August 15, 1910.

While with some brokers there is but little doing in pig iron other offices report considerable activity, with prices holding steady to firmer. Increased interest is manifest in iron for first half 1911 delivery. There is some inclination to regard the situation as improving, with a good prospect for market activity after September 1. Larger railroad purchases for iron and iron products are looked for in the early fall, based on a big freight tonnage.

Coke.—It is believed that many of the large consumers have placed their contracts for a year's supply of coke, though some are still buying in a hand-to-mouth way, apparently looking for lower prices in the face of the stiffening of values in the Pennsylvania field. A moderate volume of buying is also in evidence on the part of small consumers. None of the leading brokers reports either inquiries or sales of importance for the past week. Prices are steady at $2.40 to $2.50 for contract standard brands of Connellsville 72-hour foundry, per net ton, but for prompt shipment the price is shaded to $2.25, with Virginia offered at $2.25 to $2.50, f.o.b. oven; jobbing lots 25c. per ton higher.

Pig Iron.—In case of one office the statement was made that for the past week the business booked for pig iron exceeded the transactions for the entire month of July. These sales were mostly in lots of 500 tons, principally foundry iron. No contracts were booked at less than $11.50, Birmingham, for No. 2 Southern foundry. Among the inquiries reported by this office were 500 tons and 300 tons No. 2 Southern foundry. All the above were for shipment over the remainder of the year. Another broker reports a sale of 800 tons No. 2 Southern foundry, same shipment. A third sales agency booked orders aggregating 450 tons Northern and Southern foundry, delivery over the last quarter 1910 and first quarter 1911, also for 300 tons Southern foundry, shipment over the remainder of the year. The inquiry for 2500 tons Lake Superior charcoal, reported last week, is still pending. Conditions as to prices remain practically unchanged. While there is some business being worked for No. 2 Southern foundry for the remainder of the year at $11, Birmingham, considerable of the best brands of No. 2 Southern foundry has been placed at $11.50 with desirable buyers. With respect to some of the trade it may be stated that sellers and buyers are still apart in their views and each interest is standing pat, awaiting developments. A part of the buying is in a measure pushed by commitments for finished stock, and in some cases buyers have made additions to recent purchases. But for the fact that there are many furnaces carrying large stocks in their yards, buyers would show more disposition to add to their holdings. Quite a large percentage of inquiries now being received deal with 1911 iron. It is stated that No. 2 Southern foundry or shipment over the first half 1911 is offered at $12. Southern Ohio No. 2 foundry is quoted at $15, f.o.b. furnace.

Old Material.—Though the demand from consumers does not improve, and but little business is passing as far as dealers are concerned, the outlook is regarded as more favorable and leading dealers seem disposed to maintain the present level of prices for this reason and also to encourage the offerings of the railroads. The only list on the market last week was that of the Missouri, Kansas & Texas Railroad, 2000 tons miscellaneous scrap. Relaying rails con-

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tinue scarce and wanted. Old car wheels are in better demand than other material. We quote dealers' prices as follows, per ton, f.o.b. St. Louis:

Old iron rails	$14.50 to $15.00
Old steel rails, rerolling	14.00 to 14.50
Old steel rails, less than 3 ft	13.00 to 13.50
Relaying rails, standard sections, subject to inspection	23.50 to 24.00
Old car wheels	15.00 to 15.50
Heavy melting steel scrap	12.50 to 13.00
Frogs, switches and guards, cut apart	12.50 to 13.00

The following quotations are per net ton:

Iron fish plates	$14.00 to $14.50
Iron car axles	19.50 to 20.00
Steel car axles	19.00 to 19.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.00 to 12.50
Railway springs	11.50 to 12.00
Locomotive tires, smooth	16.50 to 17.00
No. 1 dealers' forge	11.00 to 11.50
Mixed borings	5.50 to 6.00
No. 1 busheling	10.50 to 11.00
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.50 to 9.00
Pipes and flues	9.50 to 10.00
Railroad sheet and tank scrap	8.50 to 9.00
Railroad grate bars	8.50 to 9.00
Machine shop turnings	8.00 to 8.50

Advance information on the annual report for the fiscal year 1909-1910 of the Missouri Pacific Railroad shows that the company earned $5,000,000 more gross than in any previous year in the history of the company, without including the gains made since the establishment of the through route to the Pacific Coast.

The St. Louis Car Company will build 54 new cars for the Salt Lake City street railroads, to be 50 ft. in length and of the best type. Steel underbodies will be used and the interior finish will be mahogany, thus constituting them the finest cars in the far West.

The Eagle Packet Company will at once begin the construction of a new large double wheeled packet steamer, to be run between St. Louis and Alton, Ill. It will be one of the largest on the river. It will probably be built by the Howards of Jeffersonville, Ind. The same company will also build a boat to take the place of the wrecked steamer Cape Girardeau in the St. Louis and Cape Girardeau trade.

The Streckfus Steamboat Line Company of Rock Island, Ill., has been incorporated; capital stock, $250,000; incorporators, John Streckfus, Joe Streckfus and Roy Streckfus.

Buffalo

BUFFALO, N. Y., August 16, 1910.

Pig Iron.—Shipments are going forward in good volume on contracts, Erie Canal shipments being especially heavy, but very little new business is being placed. Transactions closed are principally for small lots, the largest inquiry reported being for 1000 tons of foundry iron, mostly No. 2 X, for New England, for delivery over the remainder of the year. Such orders as were placed were largely for rush delivery, indicating that quite a number of foundries have exhausted their present stocks. It is understood that considerable resale iron, most of which was off grade, was disposed of during the week at low figures, the owners having evidently determined to let it go at a sacrifice and pocket the loss rather than carry it longer. On regular grades prices are stationary and appear to be practically down to hard pan. We quote as follows for delivery over the remainder of the year, f.o.b. Buffalo:

No. 1 X foundry	$15.00 to $15.50
No. 2 X foundry	14.50 to 15.00
No. 2 plain	14.25 to 14.75
No. 3 foundry	14.00 to 14.50
Gray forge	14.00 to 14.25
Malleable	14.75 to 15.25
Basic	15.25 to 15.75
Charcoal	18.75 to 19.25

Finished Iron and Steel.—A little better feeling is noticeable as compared with a week ago, and improvement is shown in the inquiry for steel bars, plates, shapes and power transmission material, including cold rolled shafting, but orders placed are, as a rule, for small quantities only. Prices for steel bars remain about the same as a week ago, 1.40c., Pittsburgh, being named for large and desirable orders, but it is claimed by most agencies that the general run of small orders is taken at 1.45c. Many purchasers, however, are holding off on the placement of orders of any size, anticipating that they will be able to obtain lower quotations. Plates and shapes are running at about 1.40c., Pittsburgh, for large tonnage, and 1.45c. for small lots. In fabrciated structural material the demand has lessened temporarily, although there is a good volume of fall business in sight. Plans for the Utica Hotel, Utica, N. Y., which have been held back for two or three weeks, are to come up for bids this week; about 1200 tons will be required. The specifications for the steel for the State Normal School at Oswego, which originally called for 400 tons of steel, have been revised and are now being refigured. Figures are soon to be taken on a crane runway 527 ft. in length for the malleable building of the Gould Coupler Company, Depew, N. Y., requiring a considerable tonnage. The contract for the Central avenue bridge, Rochester, calling for 400 tons of structural material and bars, has been let to Whitmore, Rauber & Vicinus, Rochester. The contract for steel for the Marine Bank Building, Erie, Pa., involving a little over 800 tons, was taken by Kratzer & Co., Pittsburgh.

Old Material.—The market still remains very quiet, but a little more activity is manifested, as compared with the stagnant condition of the past few weeks. The few sales made have been on a lowered price basis, and the general tendency is still downward. Deliveries on old contracts placed at higher figures than recent schedules are dragging, but the majority of such contracts have been closed up. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$12.75 to $13.25
Low phosphorus steel	17.00 to 17.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.25 to 13.50
Old steel axles	17.50 to 18.00
Old iron axles	21.50 to 22.25
Old car wheels	13.50 to 14.00
Railroad malleable	13.00 to 13.50
Boiler plate	10.75 to 11.25
Locomotive grate bars	10.50 to 11.00
Pipe	10.50 to 11.00
Wrought iron and soft steel turnings	6.50 to 7.00
Clean cast borings	5.50 to 6.00
No. 1 busheling scrap	11.75 to 12.00

The German Iron Market

BERLIN, August 4, 1910.

The movement to organize the pig iron trade of the country into a single big syndicate, which had held the attention of the market for several weeks, finally resulted last week in a failure to reach an agreement and the negotiations were definitively broken off. The negotiations had reached a very promising stage about the end of July, and persons of an optimistic nature began to predict that the great syndicate would be perfected within a few days. Even the stock markets, although otherwise little inclined to optimism just now, began to count upon the new syndicate as a coming event that would surely arrive, and iron shares assumed accordingly a rising tendency.

A week ago, however, the negotiations ran against a brick wall. It was found impossible to arrange allotments satisfactory to all interests. The Siegerland group of furnaces, which run chiefly on high grades of pig, including spiegeleisen, rejected the proposed allotment of 500,000 tons assigned to them, and the two new furnace companies at Bremen and Emden could not be induced to join. They evidently were disposed to use their location on tidewater as a ground for insisting upon big allotments. The old antagonism between the unattached furnaces and those operated in connection with steel companies also came into play and helped to frustrate the plans of the syndicate makers. Some of the furnaces, too, were held back by the fear lest if they should join a pig iron syndicate at this stage they would find their hands tied two years hence, when the question of renewing the great Steel Syndicate comes up. They did not want to commit themselves in advance on that momentous matter.

A Pig Iron Selling Agency Organized

The big pig iron syndicate is therefore a dead issue for the present. However, an organization of a looser kind and more limited extent was agreed upon several days ago. It embraces most of the big steel works of the west, and even includes the Niederrheinische Hütte, the company which had hitherto been the most troublesome factor in the pig iron trade of that part of the country. The big furnace company of Lübeck and the Krafft concern at Stettin are also in, and an arrangement as to prices has been effected with the Silesian group of furnaces. The new organization takes the form of a common selling agency with fixed prices and allotments. It is holding a meeting to-day for the purpose of fixing the scale of prices for 1911 contracts, and an advance is looked for, in view of the recent decision of the Coal Syndicate to raise the prices of coke. It may be said here parenthetically that many of the furnaces have just made a concerted effort to induce the Coal Syndicate to make the rise in coke only 1 mark, instead of 1.50 marks, per ton, and to postpone the time of its taking effect to January 1, but this petition was rejected.

As to the prospects of the new organisation, the market does not rate these very high. The combination cannot fully control the situation, there being some important companies in the West which have not joined, besides the Siegerland group and the Bremen and Emden furnaces. Moreover, there

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is a movement on foot just now to establish a big independent furnace company on the lower Rhine, for the purpose of turning out high grades of pig and ferro compounds. A location has already been chosen with a view to obtaining foreign coke and ore by water, and, in particular, the concern is to be made independent of the Coal Syndicate as to coal and coke. All the smaller consumers of iron in the lower Rhine region are to be asked to take stock in the new venture.

It remains to be mentioned that the new trade combination has an annex covering ferromanganese and ferrosilicon. As to the latter product the details have not yet been completed, but it has been agreed to take no orders for 1912 delivery before October 1, by which time it is hoped that all points of difference will be settled.

The heavy plate convention was renewed yesterday and the price of plates advanced by 2 marks a ton. The sales of ship plates in July were much heavier than a year ago.

The General Trade Situation Uncertain

The trade situation remains irregular and involved in doubt. It is admitted that conditions in America are exerting a restraining influence on our market. The prices of pig have further weakened. At the fortnightly trading on the Duesseldorf Exchange last week several numbers of German pig scored lower prices, as well as English No. 3 foundry. On the other hand, the price cutting in merchant pipe and boiler tubes has about ceased, and most of the works are now demanding higher prices. It is also mentioned that the demand for these products continues extremely active. As for the rest, a rather quiet tone prevails in the market. Consumers continue to buy only for immediate requirements. One of the best features of the situation is that the stocks of dealers, particularly in bars and plates, are running low, and they will soon cease perforce to disturb trade by underbidding manufacturers' prices.

From the Belgian trade the latest reports are somewhat more reassuring. The downward course of prices at least seems to have been checked, and the home trade has improved somewhat. Rail mills are very busy, and they continue to make heavy export shipments. In the pig iron trade conditions remain unsatisfactory, the sharp competition of French and Luxemburg iron exerting pressure on prices.

The stock markets and the iron trade are this week considerably excited over a project of the Deutsch-Luxemburgische Bergwerks und Hütten Gesellschaft to absorb the old Dortmunder Union, which will make it one of the biggest iron and coal companies in Germany. The Deutsch-Luxemburg company was organized in its present form only five years ago out of existing companies at Bochum and in Luxemburg with a capital of $6,000,000, but this has been increased by successive steps to $15,000,000 for the purpose of renovating and enlarging its plants and absorbing several coal mines. It is assumed that it will raise its capital to at least $20,000,000 in absorbing the Union, which would give it the fourth rank among the huge iron companies—only Krupp, Gelsengirchen and Phoenix having bigger capitals. Its allotments for rails, structural forms and semimanufactured steel in the Steel Syndicate will be 478,800 tons, or second in size only to Krupp's. It will be a new mammoth in the German iron industry.

San Francisco

SAN FRANCISCO, August 10, 1910.

The Pacific Coast iron and steel market is still without animation, local business in particular being very quiet in all departments. The tonnage in every line ordered for use in San Francisco has been less than normal for the last two months, and there is very little indication of improvement. Comparatively little building work is in prospect, and the uneasiness of industrial conditions in the iron and steel manufacturing trades is likely to prevent any large buying by those interests for some time to come. Orders booked by mill representatives are very small, though the distributive trade in the interior of the State is normal for the summer season, and the outlook is still good for an active demand from that quarter during the fall.

Bars.—Purchases of soft steel bars by manufacturing interests and the general consuming trade are still largely from hand to mouth, the aggregate being only moderate, though a fair demand is expected within the next two months. With an abundance of material in store local merchants are taking most of these small orders, and have not found it necessary to buy any considerable quantity for stock. Bars for concrete reinforcement are the leading feature in this department at present, and while few orders are individually important the movement is fairly active. A fair tonnage is required at present for sewer, water works and harbor improvements at San Francisco and other coast cities, and for general improvements, dams, culverts, reservoirs, &c., in the interior. A number of large concrete buildings to be erected during the fall will add considerably to the movement of the next few months. A large building of this type is projected for the Deere Implement Company at San Francisco, and another for the Silica Brick Company at Sacramento, Cal. The Union Oil Company is building several reinforced concrete oil reservoirs, capacity 1,000,000 barrels each, near San Luis Obispo, Cal., for which considerable steel is required. Bars from store, San Francisco, are quoted at 2.50c. for steel and 2.30c. for iron.

Structural Material.—With the exception of January, July was the dullest month so far this year in San Francisco building operations, and one of the dullest since 1906. The total valuation of building permits was $1,452,741, compared with $2,216,631 for June, and $2,154,999 for July of last year. The decrease was partially due to a strike of hod carriers, which has also caused some delay in the letting of contracts. Considerable improvement, but no very heavy volume of business, is expected in the fall. A number of contracts are coming out in the interior, and the American Bridge Company has taken a very fair tonnage in various parts of the State. The larger local shops have little work on hand, some having laid off about half of their men. Dyer Bros. have taken a small job on a bank at Newman, Cal. Bids taken for the construction of a post office at Santa Cruz, Cal., have been rejected. The Ralston Iron Works has a small job in the Wright Building, San Franciso, and steel work on bulkhead No. 10, San Francisco Harbor, was awarded to Milliken Bros., Inc. The Realty Syndicate Building in Oakland, Cal., will require about 600 tons. Plans have been completed for a new agricultural building for the University of California, Berkeley, Cal., requiring about 450 tons, for which bids will be taken August 16. Figures are being taken on a large structure for the Order of Eagles in San Francisco, amounting to 300 tons. It is announced that the Western Pacific Railroad will build a steel bridge about 640 ft. long over the American River near Sacramento, Cal., and arrangements have been made for the erection of a steel drawbridge over the Sacramento River, in which Yolo and Sacramento counties will co-operate with interurban railroad companies. Plans are being drawn by San Francisco arhitects for a 12-story building at Portland, Ore. Beams and channels, from store, San Francisco, are quoted at 2.70c.

Rails.—The present movement is comparatively quiet, consisting mostly of small orders for construction now in progress. There is considerable business in prospect. It is announced that additional contracts are to be let for the Northwestern Pacific for fall construction, and additional extensions are contemplated by interurban companies in the interior of the State. It is reported that there is some prospect of an electric line from Porterville, Cal., through Coalinga to tidewater, but no immediate business is expected from this project.

Plates.—The movement of tank plates is about normal for this time of year, though not as heavy as the activity of tank and riveted pipe fabricators would seem to indicate. Current business is confined to small orders, many of which are taken by local jobbers, and purchases for the oil fields are not of great importance. The Standard Oil Company is planning to build storage tanks at several points in California, but little has recently been heard from other oil storage projects.

Merchant Pipe.—The tonnage booked by mill interests is slightly larger than at this time last month, though the volume is still unsatisfactory. Oil pipe is extremely dull. The production of oil has been increased in the last few weeks by the opening of several more gushing wells and the heavy accumulation discourages new drilling. Most of the existing companies are apparently not in a financial position to carry out projected storage and transportation projects this year, as they have been unable to market a large proportion of their output and have been under heavy expense in handling it. A pipe line may be constructed, however, by the Oil Consumers' Association, recently organized at Los Angeles. The distributive movement of small pipe is on about the same small scale as for some time past and no general demand is anticipated before September, though a few orders for water works supplies are now coming in. The situation offers little encouragement to mill interests. Some time will be required to bring any material reduction of the tonnage in store, and by adopting clearing house methods the jobbers will be able to hold off from the market for several months. Prices on small lots of merchant pipe are firmly maintained.

Cast Iron Pipe.—The coast market is still rather dull, few orders of any consequence having been placed for several weeks. The largest recent order was that of San Bernardino, Cal., for 167 lengths of 4-in., 385 of 6-in. and 13 of 12-in. pipe, placed August 8 with C. Frolich. The Water Commissioners of Los Angeles, Cal., will receive bids August 15 for about 603 tons. Numerous small orders for fire

THE IRON AND METAL MARKETS

hydrants, &c., are being placed. A number of good inquiries are coming into the market and a fairly active movement is expected by the end of the month. Contracts are now being let for laying the San Francisco auxiliary system.

Pig Iron.—There is very little feature to the local market, conditions remaining about as previously described. Small machinery castings are in fair demand and melters are getting some work for public improvements, but the requirements are not increasing. Importers still find difficulty in placing pig iron for future delivery, most of the foundries buying in small quantities according to current needs. Prices remain about as before, Chinese being quoted at $23; Continental, $23; English, $23 to $23.50; Scoth, $24 to $24.50.

Old Material.—There is considerable movement of steel melting scrap for shipment to Atlantic ports. The local shipping firm of Bates & Chesebrough, which handles the bulk of this business, has purchased the wreck of a steamer on Santa Marguerita Island, from which a large amount of scrap will be taken, and a number of smaller wrecking operations are in progress. Cast scrap is quiet, and there is no unusual activity in railroad wrought. Prices are quoted as follows: Cast scrap, per gross ton, $17; steel melting scrap, per gross ton, $10; railroad wrought scrap, per net ton, $14; rerolling rails, per net ton, $15.

New York

NEW YORK, August 17, 1910.

Pig Iron.—Inquiry has dropped down to very small proportions; in fact, is less than at any time this year. As noted a week ago, Buffalo furnaces have taken the greater part of the recent business in this territory, freight by canal of from $1 to $1.25 making $14.50 iron, at furnace, attractive to melters at a number of Eastern points reached directly by water. A Connecticut foundry added nearly 1000 tons in the past week to the purchases recently reported. Foundries in general are melting iron at about the rate of July, but most of them appear to be covered for the third quarter. Thus far all the furnaces have had the benefit of business closed at higher prices, but it will not be long until they will be down to the low level on all the iron going out; when that time comes more furnaces will drop out of the race unless signs of better things appear. We quote Northern foundry iron at tidewater as follows: No. 1, $16 to $16.25; No. 2 X, $15.50 to $16; No. 2 plain, $15.25 to $15.50. On Southern iron quotations are $15.75 to $16 for No. 1 and $15.25 to $15.75 for No. 2.

Steel Rails.—The National Railways of Mexico placed an order for 10,000 tons in the past week with the Lackawanna Steel Company. Sharp competition among various domestic mills is reported on this business. Bookings by the Illinois Steel Company in the week are reported at 10,500 tons, including one contract for 9000 tons of Bessemer rails. The Tennessee Coal, Iron & Railroad Company took 1870 tons of new rail business.

Finished Iron and Steel.—All lines continue comparatively dull, but in spots there has recently been some slight improvement. It is probable that August will not be any better than July, and a material increase in business is not looked for until September and possibly not until October. Orders are coming in steadily in small lots, indicating that buying is mainly for pressing needs, and although prices are not strong, the total volume of business is sufficient to occasion no further reduction in producing capacity. Orders now on the books will easily care for the next six or eight weeks at least, in nearly all active plants. Structural material and plates are in the least active demand in the East. If the large water pipe contract for Portland, Maine, on which bids are to be opened September 12, should be decided in favor of steel pipe, about 16,000 tons of plates will be required. Steel bars are better, judging from the deliveries, as 12 weeks is still named for the smaller sizes, but there has been a little improvement in making shipments. Generally, bar iron is quiet, but there are exceptions, one mill reporting a better volume of orders in the past week than for some time, and another that August will show considerable improvement over July. Prices, however, are weak in all finished iron products, such as bolts, spikes, &c., but some of the railroads have been specifying for track supplies quite liberally recently. There are a few definite projects worthy of mention in the structural field. The bids are in on the Saybrook bridge, over the Connecticut River, 2000 tons, and the Pennsylvania Steel Company was the lowest of these seven bidders. The same company secured the new Pennsylvania Railroad bridge over the Schuylkill River, 1400 tons. The Jones & Laughlin Steel Company was awarded 1500 tons of fabricated steel for an addition to the plant of M. H. Treadwell, at Easton, Pa. The viaduct for the Republic Iron & Steel Company, at Youngstown, 2000 tons, has been given to the American Bridge Company. Other smaller awards for bridge work were 160 tons for the Seaboard Railroad, which went to the Phœnix Bridge Company, and 300 tons for the Chicago, Milwaukee & St. Paul, to the Pennsylvania Steel Company. Among the more important building contracts were 1600 tons for a building for the Amicable Insurance Company, at Waco, Texas, taken by the Noelke-Richards Company; a loft on East Fortieth street, New York, 800 tons, taken by the Hinkle Iron Works, and the Marine Bank, at Erie, Pa., 600 tons, taken by the King Bridge Company. The New York Central terminal work has not yet been let, nor the 1400 tons of bridge material for the Detroit, Toledo & Ironton Railroad. The Pennsylvania Lines West are in the market for about 1600 tons, and the Lake Shore for about 900 tons. Bids are being asked for a pier at 131st street, New York, on the North River, requiring about 2000 tons, and an inquiry is also out for nearly 3000 tons for a building on Fifth avenue for W. & J. Sloane. Quotations for plain structural material, plates and steel bars are now on a common level—1.56c. to 1.61c., New York—and bar iron delivered at the same point is quoted at 1.45c. to 1.50c.

Cast Iron Pipe.—Much interest has been aroused by the appearance of the long expected specifications of the Portland Water District of Portland, Maine. Bids are to be opened September 12 for the delivery on cars at Westbrook, Me., of 42-in. pipe for a long supply line. Bids will be received for both cast iron and steel pipe. The specifications for cast iron pipe call for four different weights and figure a total of 21,543 net tons. There will also be required 300 tons of specials. The Municipal Board of Canajoharie, N. Y., will receive bids until August 25 for the construction of water works, including the furnishing of 365 tons of cast iron pipe of various sizes and 8 tons of cast iron specials, also the laying of 1½ miles of 12-in. cast iron pipe. General business is quiet, although inquiries show a trifle more possibility of buying by consumers. Carload lots of 6-in. are quoted at $23.50 to $24, per net ton, tidewater.

Old Material.—Heavy steel melting scrap is neglected, but this is due to some extent to the unwillingness of dealers to part with their holdings at present offers. There is some expectation of a better demand in the near future, as it is understood that some important works in eastern Pennsylvania are now running with very low stocks. Rolling mills are buying but little from dealers, as they have been able for some time to secure what they need from railroads at lower prices than dealers ask. Several of the railroad companies having scrap lists out on which bids were received last week refused to accept the prices named and will carry over much material for another month. A little more interest is springing up in old car wheels, as several inquiries have made their appearance. Cast borings are in strong demand, but not at any better price than has recently been current. It is a curious feature of present conditions that wrought turnings are so neglected that they can be had at practically the same price as borings. Cast scrap is much more active, inquiries being numerous, but buyers are not disposed to pay better prices, although the quantity available at current rates appears to be small. Wrought pipe is in considerable demand and is quite scarce. Dealers' quotations, per gross ton, New York and vicinity, are as follows:

Rerolling rails	$12.00 to $12.50
Old girder and T rails for melting	11.00 to 11.25
Heavy melting steel scrap	11.00 to 11.25
Relaying rails	20.50 to 21.50
Standard hammered iron car axles	21.50 to 22.00
Old steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track scrap	12.00 to 12.50
No. 1 yard wrought, long	12.00 to 12.50
No. 1 yard wrought, short	11.50 to 12.00
Light iron	5.00 to 5.50
Cast borings	7.00 to 7.50
Wrought turnings	7.00 to 7.50
Wrought pipe	11.50 to 12.00
Old car wheels	12.50 to 13.00
No. 1 heavy cast, broken up	11.50 to 12.00
Stove plate	9.00 to 9.50
Locomotive grate bars	9.00 to 9.50
Malleable cast	12.00 to 12.50

Birmingham

BIRMINGHAM, ALA., August 17, 1910.—(*By Telegraph.*)

The Birmingham iron market is unchanged as far as sales are concerned, but a much better tone exists as to price. Furnace interests are strictly adhering to the $11.50 basis, and offers of round lots fail to bring forth concessions. Furnace stocks are decreasing to a certain extent and other furnace stacks contemplate going out soon. Considerable interest is manifested in the water pipe market and a fair business is in sight. The old material market continues dull.

THE IRON AND METAL MARKETS

Metal Market

NEW YORK, August 17, 1910.

THE WEEK'S PRICES

Cents Per Pound.

	Copper.			Lead.		Spelter.	
August.	Lake.	Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
11	13.00	12.62½	33.45	4.40	4.30	5.20	5.05
12	13.00	12.62½	33.75	4.40	4.30	5.20	5.05
13	13.00	12.62½	....	4.40	4.30	5.20	5.05
15	13.00	12.62½	33.55	4.40	4.30	5.20	5.05
16	13.00	12.62½	33.80	4.40	4.30	5.20	5.05
17	13.00	12.62½	33.85	4.40	4.30	5.20	5.05

There has been good, steady trading in copper, and the advanced prices of last week have been maintained. Tin has been steadily advancing all the week. Lead shows a strengthening tendency. The spelter market is very dull.

Copper.—Until yesterday there was a good buying movement in copper, and the market steadily strengthened in tone. Yesterday's trade was light and inquiries fell off somewhat, but this did not affect quotations. It is generally believed that the production of copper is being curtailed, and it is freely predicted that the August report of the copper producers will show a marked shrinkage in stocks. Lake copper is generally quoted at 13c., and electrolytic cannot be had for less than 12.62½c., while some large selling interests are asking as high as 12.75c. In London to-day spot copper was sold for £56 7s. 6d. and futures for £57 2s. 6d. The sales amounted to 400 tons of spot and 1300 tons of futures.

Pig Tin.—Pig tin has been steadily advancing all the week, although there has not been much trading. A great many buyers who anticipated a shortage this month covered their needs during July, and while it is apparent that there is none too much tin on hand, it is generally estimated that the supply will be about equal to the month's consumption. There have been sharp advances in the London market, which is largely due to manipulations by the syndicate. Buyers here seem to be awaiting further developments. Pig tin was sold in New York to-day for 33.80c. to 33.85c. At the close of the London market to-day spot tin was sold for £154 10s.

Tin Plate.—The demand for tin plate in the New York market is slightly better than it was a week ago, which is largely due to increased activity in the building trades. The price in New York for 100-lb. coke plates is maintained at $3.84.

Lead.—There is a good demand for lead and the wants of buyers are largely being filled by the leading interest, which continues to control the situation by offering lead at lower prices than those made by the outside sellers. The price for lead in New York at the present time is 4.40c., and it is being offered in St. Louis at 4.30c.

Spelter.—The spelter market is almost stagnant. There are reports of some shading in prices by sellers who are anxious to dispose of their stock, but consumers are taking very little interest in the situation, and consequently the nominal price has not been affected. The metal is being offered in New York at 5.20c.

Antimony.—Antimony is dull and prices are slightly easier. Cookson's is now being offered at 8.15c. and Hallett's can be had for 7.95c.

Old Metals.—The market is firm. Dealers' selling prices are continued from last week, as follows:

	Cents.
Copper, heavy cut and crucible	12.25 to 12.50
Copper, heavy and wire	11.75 to 12.00
Copper, light and bottoms	11.00 to 11.25
Brass, heavy	8.75 to 9.00
Brass, light	7.00 to 7.25
Heavy machine composition	11.25 to 11.50
Clean brass turnings	8.00 to 8.25
Composition turnings	9.50 to 9.75
Lead, heavy	4.05 to 4.20
Lead, tea	3.80 to 3.95
Zinc scrap	4.15 to 4.25

Metals, Chicago, August 15.—Many consumers of copper have been watching the market closely, and are prepared to buy when they feel assured against weakness in the price. Considerable copper has been sold to consumers recently and the tone of the market is firmer, without any change in price for Chicago delivery. Spelter, however, is a little higher in price on large purchases, as well as carload orders, and tin is ½c. higher on carload lots. We quote Chicago prices as follows: Casting copper, 12¾c.; lake, 13c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 34½c.; small lots, 36c.; lead, desilverized, 4.35c. to 4.40c., for 50-ton lots; corroding, 4.00c. to 4.05c., for 50-ton lots; in carloads, 2¼c. per 100 lb. higher; spelter, 5.20c. to 5.25c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c.; sheet zinc is $7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10½c.; copper clips, 11¾c.; red brass, 11½c.; yellow brass, 8⅞c.; light brass, 6c.; lead pipe, 4¼c.; zinc, 4⅛c.; pewter, No. 1, 24c.; tin foil, 26c.; block tin pipe, 30c.

Metals, St. Louis, August 15.—Lead is quiet and steady at 4.25c. to 4.30c.; spelter is fairly firm at 5.05c. to 5.10c., East St. Louis. Zinc ore is quoted steady at $38 to $40 per ton, Joplin base. Tin is quoted at 34.10c. per pound; antimony, 8.50c.; lake copper, 13.20c.; electrolytic, 12.95c., all at St. Louis. The demand for finished metals is a good average for the season, with an increased call for railroad brasses.

Iron and Industrial Stocks

NEW YORK, August 17, 1910.

The stock market has been steadily increasing in strength since last report, owing to the better conditions prevailing in the agricultural sections of the country. Business interests are feeling more confidence in the immediate future. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week is as follows:

Allis-Chalm., com.	8⅞ - 9¾	Pressed St., com.	34¾ - 37⅝
Allis-Chalm., pref.	28 - 32	Pressed St., pref.	95
Beth. Steel, com.	26 - 27¼	Railway Spr., com.	31¾ - 34¼
Beth. Steel, pref.	49 - 58	Republic, com.	29½ - 32½
Can, com.	8½ - 8¾	Republic, pref.	90½ - 93
Can, pref.	66¾ - 69	Sloss, com.	59 - 62½
Car & Fdry, com.	46¾ - 49½	Pipe, com.	14 - 14⅝
Car & Fdry, pref.	111½-112	Pipe, pref.	55
Steel Foundries	44 - 45	U. S. Steel, com.	69 - 72¾
Colorado Fuel	28¾ - 32	U. S. Steel, pref.	115⅝-117
General Electric	143¼-145	Westinghouse Elec.	59 - 61
Gr. N. ore cert.	53½ - 56½	Am. Ship, com.	80 - 82
Int. Harv., com.	90½ - 97¼	Chi. Pneu. Tool	35 - 36⅜
Int. Harv., pref.	117 -118	Cambria Steel	41⅛ - 43⅞
Int. Pump, com.	39¼ - 40¾	Lake Sup. Corp.	19½ - 20⅞
Int. Pump, pref.	81 - 81½	Warwick	9
Locomotive, com.	36 - 39	Crucible St., com.	11¾ - 13⅜
Locomotive, pref.	103½	Crucible St., pref.	74½ - 76¾
Nat. En. & St., com.	15¾ - 16½		

The Montreal Steel Works, Ltd., Montreal, Canada, it is stated, intends to issue $1,000,000 30-year 6 per cent. bonds to provide for extensions to the plant now under way, only $750,000 of which will be issued immediately.

The stockholders of James B. Clow & Sons, Chicago, on August 8 increased the capital stock from $1,000,000 to $1,500,000 by the creation of $500,000 additional 7 per cent. cumulative preferred stock making the total issue of preferred $750,000. This action was taken on account of increase in the business due to the completion of manufacturing plants built and equipped from earnings during the last few years. The new issue will be offered for subscription at $100 a share, with interest from August 1, payable 25 per cent. with subscription and 25 per cent. September 1, October 1 and November 1; 7 per cent. will be allowed on partial payments.

The Cleveland Furnace Company, Cleveland, Ohio, has increased its capital from $1,000,000 to $2,000,000 to provide additional working capital. The new stock will be offered at par. The surplus and undivided profits on March 31 amounted to $1,098,712.

Dividends.—The General Electric Company has declared the regular quarterly dividend of 2 per cent., payable October 1.

The National Enameling & Stamping Company has declared the regular dividend of 7 per cent. on its preferred stock, payable in four quarterly instalments of 1¾ per cent. each on the last day of each quarter—September 30, December 31, March 31 and June 30.

The Heywood Bros. & Wakefield Company has declared the regular semiannual dividend of 3 per cent. on the preferred stock, payable September 1.

The United States Cast Iron Pipe & Foundry Company has declared a dividend of 1¼ per cent. on the preferred stock, payable September 1. The dividend for the past two quarters has been at the rate of 7 per cent. per annum. The dividend on the preferred stock is noncumulative. The officers of the company state that the earnings for the first quarter of the present fiscal year are in excess of the amount required to pay the dividend just declared, but believe that a conservative policy should be pursued, owing to the present condition of general business.

The output of finished iron and steel in Russia in 1909 is put at 2,572,000 tons, as compared with 2,335,000 tons in 1908. The distribution of these respective totals is as follows: Merchant iron, 851,900 tons and 893,300 tons; rails, 467,400 tons and 325,400 tons; thick plates and sheets, 249,300 tons and 265,100 tons; thin plates and sheets, 332,700 tons and 288,400 tons; joists, 147,500 tons and 128,500 tons.

The Machinery Markets

With the exception of New York City territory, where business is exceptionally good for this time of the year, the machinery trade throughout the country is experiencing the expected dull summer period, and attention is largely being given to looking up prospective orders. Optimistic reports as to the outlook come from all quarters, numerous indications pointing to a good fall trade. In the machine tool centers, it is stated that manufacturers have been unable to stock up to any extent, and if business should prove unusually good there may be a shortage in some classes of machinery equipment. There is an excellent supply of second-hand machinery, however, and that stock would help materially toward relieving any scarcity. In New York the trade is bidding against inquiries issued by the New York Central and the Pennsylvania railroads. The latter company is equipping a new shop at Cape Charles, Va. In Chicago the trade is looking for the Trans-Continental Railway of Canada to close orders against a large list issued last spring. A continued improvement in most directions is noted in Milwaukee, and many new enterprises are in formulation in that vicinity. In St. Louis and in Detroit a great deal of estimating on future requirements is being done, but immediate trade is dull. A decided improvement is shown in business in Pittsburgh, where hydro-electric enterprises are calling for heavy machinery expenditures. In Cincinnati many houses report their August business to be as good as that done in July, which was considered an especially heavy month. In other parts of the country trade is rather quiet.

New York

NEW YORK, August 17, 1910.

Machinery business in the metropolitan territory seems to be somewhat better than in the rest of the country. Manufacturers in general are good customers in the market just now and some good sized orders are being placed against the extensive inquiries which were sent out in June and in the early part of July.

The New York Central Railroad has issued inquiries supplementing a list sent out several weeks ago, and it is estimated that the railroad is at present asking for bids on equipment which will entail expenditures amounting to fully $50,000. The New York Central lines have been buying quite steadily during the last three weeks, and most of the orders placed were for machines for replacements. It is not known what disposition the company proposes to make of the equipment it is now inquiring for.

The Pennsylvania Railroad is buying against a small list of requirements, to be installed in new shops recently built at Cape Charles, Va. It is said that the list in question was not generally circulated, but that the company sent inquiries to manufacturers and dealers covering only one or two machines at a time.

New inquiries are not as plentiful just now as they were a month ago, but a number of projects are talked of that will result in some good business in the very near future. A good indication of the trend of trade is contained in the fact that two of the largest manufacturers of electric elevators in the country have their plants ordered up to full capacity for the next eight weeks at least. Manufacturers of small gas engines and electric power units are unusually busy, considering the season.

The demand for heavy power equipment has fallen off somewhat, as most of the inquiries cover requirements for extensions rather than for new factory projects.

Another plant is to be added to the colony of automobile manufacturing works at Long Island City, which promises to become an important center in that industry. The manufacturers of the Mercedes car, which is now made in Germany, have secured a preliminary permit from the municipal authorities for the erection of a plant at Thompson avenue and Lincoln street, which it is estimated will cost $25,000. The Mercedes Company has offices in the Times Building, New York, and also conducts the Mercedes Repair Company at 159-161 East Sixty-fourth street.

The Otis Elevator Company, 17 Battery place, New York City, is preparing to build an addition to its plant at Harrison, N. J., at a cost of about $50,000. The addition will be used as a foundry and it will be a one-story building, brick and steel construction, 60 x 200 ft. Most of the machinery equipment required will be moved to the shop from their plants. George K. Hooper, who has offices at 165 Broadway, is the engineer in charge.

The Central Railroad of New Jersey and the Philadelphia & Reading Railway are jointly constructing a wood creosote plant at Port Reading, N. J., which will be one of the largest plants of its kind in the country. The construction work will include the erection of two docks, each 900 ft. long, and the equipment to be installed will consist largely of special machinery for manufacture of the creosote and lumber handling machinery.

Plans have been prepared by D. C. Newman Collins, 29 Broadway, New York City, for two new factory buildings to be erected at Hudson, N. Y., for the Gifford-Wood Company, manufacturer of ice tools. One building will be 84 x 468 ft. and the other will be 70 x 370 ft. Both will be two-story structures and the equipment will include an automatic sprinkling system. The general contract for the erection of the building has been awarded to the Torrington Building Company.

The Roessler & Hasslacher Chemical Company, 100 William street, New York, has completed the purchase of 5 acres of water font property at Perth Amboy, N. J., where it expects to erect a large drug and chemical plant that will cost about $400,000. Arrangements for the construction of the plant were made several weeks ago, but because of legal technicalities it was found necessary to get the permission of the municipal authorities before the property transfer could be made.

The Fulton Machine & Vise Company, Lowville, N. Y., has increased its capital stock from $50,000 to $300,000, for the purpose of providing increased manufacturing facilities necessitated by the growth of its business. A new foundry will be built, of steel and concrete blocks, with a fireproof storeroom. Considerable additional modern equipment will be installed, including a crude oil brazing furnace. The company will add a full line of power pumps to its present line of iron and brass centrifugal pumps, belt and motor driven, and a number of improved styles of vises will also be added to its product.

The Latty Mfg. Company, which has recently erected a factory at Ellicottville, N. Y., for the manufacture of small nails, tacks and other wire products, is now in full operation. G. Frank Latty is general manager.

The city of Ogdensburg, N. Y., has plans in progress for the installation of a filtration plant, and the Board of Aldermen has passed a resolution providing for the issue of $175,000 in bonds for the purpose.

The Genesee Valley Power Company, Fillmore, N. Y., E. E. Peake, secretary, contemplates installing an additional water wheel and duplicating its A. C. generator equipment, providing new switchboard, &c., in preparation for the extension of its transmission system to neighboring villages in the near future.

Chicago

CHICAGO, ILL., August 16, 1910.

August continues very quiet in the Chicago machinery market. There are scattering inquiries from individual buyers and a little business is being done, but this is really the vacation period in the machinery trade of the West and dealers do not expect much activity for a few weeks. Last year at this time the automobile manufacturers were very heavy buyers of tools, but only a few of the concerns in this industry are going forward with plans for expansion for the coming year, and a great many orders that were placed during the spring for delivery this fall have been canceled or suspended. Dealers as a rule would not be anxious to take much automobile business at present, even if it were offered them. The fact is recognized, however, that there is an almost unlimited market in the United States for automobile

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manufacturers who sell their machines to the farmers, and it is believed that the present check in the business is merely a matter of resurveying the field in the automobile trade and eliminating unnecessary charges which have added to the cost of manufacturing and distributing the product.

Dealers report that no important business has been closed as yet on the large railroad lists that have been pending for several months. It is understood, however, that the commissioners of the Transcontinental Railway of Canada are about to close on tools for their extensive shops at Winnipeg, a list of which was published in *The Iron Age* last spring. The dealers here still have a great deal of business on their books, sold last spring, on which the factories are behind with deliveries, and it is generally expected that there will be another buying movement which will fill up the books before the business now in hand is cleared up.

The Gary district promises to be a very important market for machine tools during the next year or two. Several large subsidiary plants are now under construction to convert the semifinished steel into finished products, and many of these industries will be large buyers of tools. The American Bridge Company has ordered a large installation for its plant, and other finishing plants will be in the market from time to time.

The Marshall & Huschart Machinery Company, Chicago, has completed its removal into its new building on Jefferson street, Chicago. The new building is one of the handsomest and best arranged houses in the country for the display of machine tools. The interior fittings and the equipment for the demonstration shop have not yet been completed, but are now in progress, the removal of the company to its new building having been hastened somewhat by the necessity for vacating the quarters occupied for many years on Canal street.

The Lennox Machine Company, Marshalltown, Iowa, is running its plant with a full complement of hands on an open shop basis.

Williams, White & Co., Moline, Ill., are very busy on their regular standard lines of machines and that business in general is very good.

The Root-Van Dervoort Engineering Company, East Moline, Ill., which recently increased its capital stock from $250,000 to $1,000,000, has closed a deal for the purchase of an entire block of land lying immediately north of its foundry and machine shops, which makes its total holdings approximately 17 acres. While the purchase of this land was made to safeguard any future developments the company may undertake, it is understood that plans are under way for the construction of a large warehouse.

The Chicago Bridge & Iron Company, Chicago, has purchased 25 acres of land at Greenville, Pa., upon which it will erect a plant at an initial cost of about $100,000.

A committee has been appointed by the City Council of Paris, Ill., to investigate the cost of installing a filter plant.

The roundhouse and machine shops of the Chicago & Northwestern Railroad Company at Chadron, Neb., which were recently destroyed by fire, are being rebuilt and orders have been placed for such tools as were destroyed.

The city of Vandalia, Ill., is in the market for one 125-kw. alternator, one 250-hp. engine and one 50-hp. motor. Geo. L. Whiteman, city clerk.

Philadelphia

PHILADELPHIA, PA., August 16, 1910.

The majority of sellers find no betterment in the demand, although here and there a trifle more buying, due to closing up of pending propositions is reported. The bulk of the business has been of the single tool character, and while confined usually to tools of the smaller class, a few sales of heavier tools have been made. Inquiries for the most part are light and confined to near future requirements. No fresh propositions covering any extensive shop equipments have come out during the week. Railroad business as far as machine tools are concerned shows no movement, although some scattered orders for both motive power and rolling stock are reported. A canvass of manufacturers of both machine tools and general machinery shows the trade to be actively engaged on work on hand. In a large proportion of instances builders have a good supply of orders on their books, enough to keep them actively engaged for some time ahead. Some report new business comparatively light, while in certain special lines a good average business was transacted in July and has been well maintained so far during the present month. The demand for cranes and hoists as well as the general line of heavy presses appears to be particularly well maintained.

Steel casting plants report a trifle better demand, not so much, however, from builders of machine tools, the bulk of work coming from locomotive builders. Makers of crucible steel castings, particularly for automobile work, report a continued good demand. Gray iron foundries show no particular increase in business, but maintain about an even productive basis.

The second-hand tool and machinery merchants report no marked increase in the demand, the usual midsummer dullness characterizing the trade.

The order for the machine shop equipment for the battleship Wyoming, building at the yards of the Wm. Cramps Ship & Engine Building Company, this city, for the Government, has been awarded to Manning, Maxwell & Moore. The usual equipment, covering lathes, drill presses, shaper, milling machine, &c., was included.

The Reading Iron Company, Reading, Pa., is about to erect an overhead crane runway from its Scott Foundry across Cedar street to its boiler shop yard, and to give proper clearance it is necessary to reconstruct the boiler house on the west side of the street. Its own departments will furnish the necessary power equipment for the change.

The Ferracute Machine Company, Bridgeton, Pa., finds orders during July up to the usual average for that month. It is well fixed as far as orders are concerned and is running its plant at full capacity, including several nights a week. Inquiries are reported promising and a full quota of orders is anticipated during the current month.

Revised plans have been prepared by Joseph E. Sperry, architect, Baltimore, Md., for the eight-story department store addition to that of Hochschild, Kohn & Co., Howard and Lexington streets, in that city. Henry Adams is the engineer and new bids will be asked.

Ira J. Williams, Morris Building, this city, represents a prospective renter or purchaser for a factory building with foundry attached, containing 75,000 to 85,000 sq. ft., in or about Philadelphia. Railroad facilities desired but not essential. At this time the purpose for which the plant is desired or the names of the principals interested is withheld.

The Stoever Foundry & Machine Company, Myerstown, Pa., advises that it is particularly busy in its foundry department, and has several very satisfactory orders on its books for pipe threading and pipe bending machines. No improvements will be made at its present plant, as it will be removed to Easton, Pa., under the plan of consolidating this plant with those of the Lebanon Steel Casting Company and Treadwell & Co., now located at Lebanon, Pa.

The Lehigh Valley Railroad has, it is stated, let a contract for lowering the grade of its main line over a stretch of 13 miles, the work beginning at Hayes Creek. The contract, it is said, has been awarded to Hyde, McFarland & Burke of New York and will aggregate an expenditure of over $1,000,000. Further extensive work, including a classification yard at Hazelton, Pa., is also contemplated.

The Board of Awards, Baltimore, Md., has awarded the contract for a bridge over the Western Maryland Railroad tracks at Seventh street to the Raymond Concrete Pile Company, whose bid was $33,000. A contract for a steel and concrete bridge over Stony Run was awarded to C. B. Clarke & Co. of Asheville, N. C., who bid $47,720 for the work.

The Standard Pressed Steel Company is now installing the new machinery for the addition to its plant previously referred to. For some of its products this firm reports a decreased volume of business; in others, however, it is fully maintained. Pressed steel shaft hangers have recently been shipped for export to Sydney, Australia; Holland, Belgium and Germany, while a very good domestic demand from New England and the Middle West is noted. The plant continues in operation at full capacity.

The Royersford Foundry & Machine Company, Royersford, Pa., states that its power transmission business for July was the best that it has ever had, and that during the present month it has been just as satisfactory. The demand for heavy punches and shears has been quiet. A 3a punch and shear has been sold a customer in Brooklyn, N. Y., and a better volume of business is anticipated in the near future. This company is now arranging for the erection of an additional story to its warehouse, which will materially increase its storage facilities.

Proposals will be received until September 6 by the Constructing Quartermaster, Fort Du Pont, Delaware City, Del., for constructing a brick quartermaster's shop and moving and enlarging the ordnance shop at Fort Du Pont, Del., where plans can be seen; these may also be had at the office of the Chief Quartermaster, Governor's Island, N. Y.

The Pennsylvania Shafting Company, Spring City, Pa., has experienced no decrease in its volume of business. Plant No. 2 has just been completed by this concern, which will add about 50 per cent. to its productive capacity. Power will be turned into the new plant some time this month. Orders recently have been fully up to the average, while shipments of finished products have been large.

A first mortgage has been filed in this city for $4,000,000 by the Philadelphia & Western Railway. A portion of the proceeds from the sale of the bonds against this mortgage

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will be used for an extension of the electric line from Strafford to Norristown, Pa. From the latter city a branch line to Lansdale or North Wales is proposed, so as to connect with the line of the Lehigh Valley Transit Company, which will give it a direct line from a number of towns in eastern Pennsylvania.

New England

BOSTON, MASS., August 16, 1910.

The predominating feature of the machine tool market is an assurance, daily becoming more pronounced, that the fall trade will be a good one. The buying of raw materials affords an excellent index of what is to be expected. For example, consumers of wire, who use it in a large way for manufacturing, are placing orders which indicate preparations for a full, normal business. Steel salesmen make a similar report. The machine tool people are adjusting themselves to the somewhat altered conditions resulting from cancellations of orders by some of the important automobile builders of the Middle West. Manufacturers of automobile parts and accessories who have received advices holding up deliveries are watching the situation keenly, with the expectation that a certain percentage of cancellations will follow. The effect of this movement will not be serious, probably. Most of the manufacturers affected have been compelled to refuse orders, and doubtless the market will continue to absorb their product.

The cotton manufacturing industry, the chief bugbear of the New England croakers, is on the mend. The curtailment which was the natural outcome of the exceedingly high prices of raw cotton has resulted in depleted stocks everywhere, which makes it imperitive that manufacturing shall resume on a much larger scale. Conditions in the mills are improving already and they should be running full within the next three months. This should bring a quick return of the textile machinery business to full capacity. Many doubting opinions of the business outlook have been based upon the cotton industry and applied to business as a whole. As a matter of fact, the unusual conditions prevailing in this raw material market has caused the trouble and not a lack of demand. Had cotton been at an average price production would have been consistently active. In the metal industries the vacation season is now on, with the usual shutdowns during which repairing and rearranging are in process. Idleness of producing forces is not great. To quote a veteran observer, a very successful business man who is in close touch with many branches of the trade, New England is producing this year as great a total volume of metal goods as in any other similar period of the past. Capacity being much greater, room for improvement exists, and prices are lower than they have been, which brings the value of current production somewhat lower than the extreme record.

The Boston Fire Department lost its repair shop by fire August 10. A large amount of machine tool equipment will have to be replaced in the near future. Another fire which interests the trade was that of the Maxwell Building on Massachusetts avenue, occupied as a garage.

Shippers are interested in the probable action of the Interstate Commerce Commission in regulating the demurrage rules in New England, so that they will conform to the practice of the rest of the couutry, of 48 hours' exemption from demurrage charges, in place of the present more extended time, in Vermont and Connecticut, of 96 hours. Recent extension of the power of the commission is held to give them authority to enforce the 48-hour rule, even in the face of State statutes. Hitherto the commission has been limited in its action to a recommendation to the railroads of the country. It is held that the difference in rules as between States militates against a harmonious, universal practice.

The Bay State Brass Company, Haydenville, Mass., has been petitioned into bankruptcy by creditors. An effort has begun to reorganize and continue the business. The company was formed in 1906, when the factory was established.

The Pope Mfg. Company, Hartford, Conn., is rapidly utilizing the large buildings recently purchased, formerly occupied by the tube company which went out of existence some years ago. The commercial and public service vehicle departments are being concentrated there, including the manufacture of motor fire wagons, ambulances and police wagons, as well as commercial trucks, which constitute the latest addition. Harold L. Pope has been made manager of the West Works, as they are now called.

The Cooper Oven Thermometer Company, Terryville, Conn., is relieving the congestion of its factory by the erection of a warehouse 20 x 40 ft., which will release space in the main building for manufacturing purposes. Since the addition of the Whittier thermometer the business has increased rapidly and the works are very busy.

The Union Twist Drill Company, Athol, Mass., manufacturer of twist drills, gear and milling cutters, is erecting an addition to its No. 3 building, 62 x 141 ft., four stories, which will be devoted to an extension of the drill business. An addition to the hardening room is also being built, 32 x 51 ft., one story.

The American Rotary Machine Company, Hartford, Conn., has been incorporated under Connecticut laws to take over all American patent rights of the Von Pittler system of rotary engines. A. K. Baylor, New York, is the president and treasurer; E. M. Sawtelle, Englewood, N. J., vice-president and assistant treasurer, and W. Baylor, New York, secretary. The directors are A. K. Baylor, A. F. Rockwell, president of the New Departure Mfg. Company, Bristol, Conn.; G. A. Unger, Marine and Field Club, Gravesend Bay; Frank Shearman, Cardiff, England, representing British shareholders, and Herr Fleischhauer, Berlin, Germany, and William Von Pittler, London England, representing the Germany company. The company acquires the patent rights on a hydraulic transmission equipment for motor cars and a similar equipment for stationary work, two house service water pump sets, two water pumps for general work, a boiler feed pump, vacuum cleaner, water meter and an air compressor and vacuum pump. Contracts have already been made for the manufacture of some of this equipment. A sub-company, to be known as the Rotary House Pump Company, will manufacture the house pumps. Another sub-company will be organized to manufacture boiler feed pumps. After such applications of the principle as have been developed and standardized by the German and Austrian companies have been put on a commercial footing, the American company will devote itself to the creation of other equipment under the patents, and will establish an experimental department in shops already secured in Hoboken, N. J. The executive offices of the company are at 103 Park avenue, New York.

The Holmes & Edwards Silver Company branch of the International Silver Company will build an addition to its works at Bridgeport, Conn., and states that the necessary machinery has been contratced for.

The Atwater Mfg. Company, Plantsville, Conn., manufacturer of hardware, has reorganized its Board of Officers by the election of Norman H. Barnes president and Alfred M. Smith secretary and treasurer.

The New Bedford & Edison Light Company, New Bedford, Mass., has received authority from the Massachusetts Gas and Electric Light Commission to increase its capital stock to the amount of $215,000, a part of the proceeds to be devoted to additions to the plant.

Cincinnati

CINCINNATI, OHIO, August 16, 1910.

While the inquiry for machine tools is good, some builders claim that buyers are slow sending in orders; others seem to be receiving a fair amount of business from the general trade all over the country. A prominent machine tool manufacturer, who reports July as being a satisfactory month, predicts that August will show up equally as well, and probably better, and that any temporary let up in buying is not to be considered at all discouraging. One interesting feature of the present situation is that not many tools, even of the standard sizes, are being stocked up, and should a sudden heavy buying movement commence deliveries will prove a serious problem. The suggestion for inserting a non-cancellation clause in all machine tool contracts is a very interesting question with many local firms, and it is believed that a little concerted action would bring about this reform.

The smaller sizes of steam engines and boilers are poor sellers in this territory, but there is a good business in internal combustion motors using natural gas. It is stated, however, that there are a number of prospects in sight where large steam units will be required.

Both new and second-hand machinery dealers did a fair business the past week, and prospects are good for a busy fall season.

The additions to the Cincinnati plant of the Laidlaw-Dunn-Gordon Company at Elmwood place will be completed within a month. The improvements will double the capacity of the foundry and very much increase that of the machine shop.

The Executive Committee of the Cincinnati Branch, National Metal Trades Association, held its regular monthly meeting August 11. General business conditions were discussed and every one reported business in a good healthy condition. Figuring the record breaking year of 1907 at 100 per cent., the reports showed that the metal working factories of the Cincinnati district are now employing 92

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per cent. of the number of men employed then. The National Lead Company's application for membership was passed on favorably.

The United States Electrical Tool Company, whose present factory is at 1938 West Eighth street, Cincinnati, has started work on a new plant at Sixth street and Mount Hope road. The new building will be 67 x 200 ft., two stories, and of brick construction. In addition to the company's present equipment, which will be removed to the new location, considerable more will have to be provided.

The capital stock of the B. F. Goodrich Company, Akron, Ohio, has been increased to $20,000,000, and it is stated that several new buildings will be erected and the capacity of its rubber tire plant greatly increased.

The plant of the Cincinnati Electrical Tool Company, at 650-52 Evans street, Cincinnati, is being increased by the building of a two-story brick addition, which will nearly double its capacity.

Sealed proposals will be received until September 7 by the Board of Trustees of the Ohio University, Athens, Ohio, for additions to the power plant, including the mechanical equipment and the heating apparatus for two halls.

On August 11 fire completely destroyed the large agricultural implement manufacturing plant of the H. P. Deuscher Company, Hamilton, Ohio. The estimated loss is $100,000, with $60,000 insurance. Plans are already under way for rebuilding the factory on a much larger scale.

It is stated that the Mead Engine Company, Dayton, Ohio, has completed plans for a large factory to be constructed on Mound street, in that city.

Among recent contracts closed by the Cincinnati office of the Buffalo Forge Company is one for the heating apparatus for a large warehouse of the Old Crow Distillery, in Franklin County, Ky. This makes the sixth warehouse in which the distillery company has installed the mechanical air blast system of heating.

The Cleveland Motor Truck Mfg. Company, Cleveland, Ohio, recently incorporated with a capital stock of $250,000, has leased a factory building which it will use for manufacturing purposes. The company advises, however, that it is its intention to erect within the next year or two a new plant. In the quarters now occupied the company will use electric power and heat secured from an adjoining factory. Orders for additional machine tools and equipment will be placed in about 30 days.

The Knoblock-Heidman Mfg. Company, South Bend, Ind., manufacturer of the quick action line of ignition apparatus, is now occupying its new factory building, 80 x 130 ft.

The Bromwell Brush & Wire Goods Company, Greenburg, Ind., has awarded a contract for the erection of an addition to its plant, 62 x 202 ft., to be completed in 60 days.

The Bauer Machine Company, Jeffersonville, Ind., has increased its capital stock by an issue of $30,000 of preferred. George H. Holzbog is president of the company.

The DeTamble Motor Company, Anderson, Ind., has practically completed negotiations for the sale of its plant to a New York automobile syndicate. Edward S. DeTamble, president, and Fred DeTamble, sales manager, will move to California.

The Great American Automobile Company, with headquarters at Indianapolis, Ind., has secured a charter from the State of Delaware. The incorporators are Samuel Quinn, Jr., Charles N. Lee and L. H. Van Briggle of Indianapolis, with H. Davis, resident director at Wilmington, Del. The capital stock is $1,500,000. The company has an option on 80 acres near the Indianapolis motor speedway, on which it is proposed to erect the factories, plans for which are now being made. The company is authorized to manufacture anything propelled by a motor, including aeroplanes.

Harry Wainwright of the Wainwright Engine Works, Connersville, Ind., has designed a six-cylinder gasoline motor, the distinctive feature of which is the arrangement of valves in the cylinder head. Instead of being placed in a straight line across the head they are in two shorter lines, permitting the use of larger valves and making more economical use of the surface. The McFarlan Automobile Company of Connersville will use the new motor in its cars.

The Attica Industrial Company has been incorporated at Attica, Ind., to promote the city's industrial welfare by endeavoring to secure factories to locate there. The directors are A. S. Peacock, E. D. Robison, C. L. Green and others.

The Otis Elevator Company will build a large addition to its plant at Peru, Ind., the city having raised $8000 to extend the water mains so that the company's property will have fire protection. The addition, which will be of brick, will give employment to 300 men.

The John H. McGowan Company, Cincinnati, has recently booked an order from the municipality of Chillicothe, Ohio, for one of its triple expansion engine pumping outfits having a capacity of 2,000,000 gal. It is also getting ready for shipment a similar outfit of 3,500,000 gal. capacity for the Madison, Ind., water works.

Pittsburgh

PITTSBURGH, PA., August 16, 1910.

The situation in this district continues to show improvement. Buying for the account of industrial establishments in general, as distinguished from the distinctively metal working plants mentioned last week in this report, is on the increase. Many special interests, such as large hydroelectric power companies, are again coming into the market for machinery. There is even promise of considerably greater activity on the part of the railroads, as foreshadowed by items printed in recent issues of *The Iron Age*, but in this respect the trade has been disappointed so often that it is inclined to be skeptical. Some buying of small lots of tools for new or extended repair shops, and apparatus of various sorts used at terminals, make-up points, roundhouses, coal handling plants, signal stations, &c., has, however, developed in such a way as to give more color to that expectation. This is because many of the expenditures represent actual improvements and are not chargeable strictly to maintenance, indicating a more liberal policy in the operation of the roads affected. It is also evident that an era of renewed railroad building, as strikingly exemplified in the action of the Western Maryland Railroad Company, is about to be entered upon in different sections of the country, including the Southwest and Pacific Northwest, which will lead, in due course, to extensive purchases of equipment and supplies.

Reports received here by one of the leading manufacturers of equipment for electric traction systems indicate an amazing amount of new work in every State of the Union, with actual or prospective investment of many millions in track and line material, power house machinery, car motors, controllers, compressors, brakes, &c. Existing systems are also being remodeled and improved, heavier rails laid, larger cars and motors provided, additional generating units purchased, transformer and converter substations built, and substantial encouragement given to the location of factories along their rights of way. In this situation alone there is large promise for the future.

The National Roll & Foundry Company, Avonmore, Pa., which has some large contracts in hand, is increasing the output of its planer department, as well as other sections of the works, but has been able to do so without adding any machinery.

L. P. Schaefer, 1558 East street, Pittsburgh, has been negotiating with an automobile company for the occupancy of a manufacturing plant which he controls.

The West Virginia Pulp & Paper Company is making installations of power and operating machinery in its plants at Piedmont, W. Va., and Tyrone, Pa. Later in the year some additional apparatus, including electric motors and controllers, is likely to be required.

Vanadium steel springs are now among the specialties of the Fort Pitt Spring & Mfg. Company, McKees Rocks, Pa., whose sales offices are in Pittsburgh.

The Westinghouse Electric & Mfg. Company, Pittsburgh, which has made Houston, Texas, its principal distributing point for the Southwest, is preparing to build a large warehouse there for the storage of machinery and electrical apparatus of various kinds. The trade of the company throughout that section has been notably good this year, and at the present rate of increase it will be much larger by spring.

From inquiries received by the Pittsburgh office of the Cutler-Hammer Mfg. Company, Milwaukee, it is evident that the use of lifting magnets for handling iron and steel is receiving much more attention than in any previous period. The operation of those in service at the various steel mills, foundries, &c., of the district has been quite closely watched by the superintendents of neighboring plants, with the result that many are being included in plans for projected improvements.

The McConway & Torley Company, Pittsburgh, is putting on the market a coupler for interurban railway cars which can also be used with steam railroad equipment, making it particularly convenient for roads that interchange freight, as some are now doing.

The Erie Light & Power Company has been organized at Erie, Pa., to establish a public service plant. An application has been made for a State charter.

The Kroenert Smelting & Refining Company, Pittsburgh, the completion of whose new plant was noted some weeks ago, is doing a large business, among its best customers being foundries that are making a specialty of aluminum castings for the automobile trade.

The Consumers' Electric Company, Wheeling, W. Va., is proceeding with plans for the erection of a power plant for public service. The equipment details have not yet been fully worked out.

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The Pittsburgh Track Specialty Company, Pittsburgh, is finding a market in various parts of the country for cast steel poles, which can be furnished either solid or cored and are practically indestructible. They are intended for electric railway service.

The Riter-Conley Mfg. Company, Pittsburgh, has been awarded the contract for erecting a steel gas tank and holder for the St. Paul Gas Light Company, St. Paul, Minn. The contract amounts to $130,000.

The Johnson Mfg. Company, Urbana, Ohio, has made arrangements for the building of a new factory structure, 90 x 180 ft., ground for which was broken some weeks ago.

The herringbone iron lath, which has been a standard product of the General Fireproofing Company, Youngstown, Ohio, is now being manufactured from American ingot iron from the mills at Middletown, Ohio.

The A. M. Byers Company, Pittsburgh, is arranging for the installation of a new engine driven electric power unit of 500 kw.

Manufacturers in this district have been figuring on some equipment for the new plant of the Ft. Wayne Electric Works, Ft. Wayne, Ind., but the bulk of the business appears to have gone to New York and Philadelphia.

Progress is being made with the plans of the Gaeth Automobile Company, now of Cleveland, Ohio, for a large new manufacturing plant in Pittsburgh, and it is reported that a list of the additional machinery required will be given to the trade shortly.

Western railroads are making a vigorous effort to obtain men here for work in locomotive repair and car building shops, but without much apparent success.

The Wehrle Company, Newark, Ohio, which uses molding machines in its foundry, is adding to the present capacity. Some difficulty has been experienced lately in securing skilled operatives for the work. Floor molders are also scarce.

It is reported from Norwalk, Ohio, that the Huron Works there, which are under a new ownership, will be improved and operated to their full capacity.

The Ellwood City Forge Company, Ellwood City, Pa., has filed application for a charter, with a capital of $25,000. It will erect a plant to be equipped with hammers and other machinery to manufacture engine and machine forgings. The contract for the hammers and some other equipment has been placed, but a 100-hp. boiler will be required which has not been ordered yet. D. A. Evans is secretary and treasurer.

The Ellwood City Iron Works Company, Ellwood City, Pa., is now operating its plant on a line of fire escapes and light structural steel work and has contracts on its books which will insure steady operations for several months. The company has already outgrown its present quarters and is planning to make additions to its plant this fall. A line of machinery will be required later, a list of which is not as yet available.

Detroit

DETROIT, MICH., August 16, 1910.

Without regard to the automobile trade, in reference to which there are conflicting reports, it is becoming more apparent daily that the broadening in the general market for machinery which has taken place within the past year will insure for manufacturers and dealers here an excellent fall trade. A great deal of estimating on future requirements of industrial plants is now being done, and architects, mill engineers, and others are busy with plans for new factories or additions. During the remainder of the open season construction work will be pushed so as to insure at least the completion of the exteriors of buildings before snow flies. It is felt by many that winter will set in early this year, and they are making their preparations accordingly. So far as actual bookings are concerned, the situation is generally satisfactory to dealers, as well as manufacturers, and inquiries are sufficiently liberal to justify expectation of a good record for the month.

A large new factory building is being added to the plant of the Big Four Hardwood Company, Toledo, Ohio, which will engage in the manufacture of a number of specialties besides its standard line of products.

A test was recently made of the Curtis steam turbine, heretofore mentioned, which has been installed by the Quincy Mining Company, Houghton, Mich., to operate on the exhaust steam from one of its hoists, and, as a result, the use of a second machine in another location is being considered. It is stated that the saving of fuel amounts to nearly or quite ½c. per pound in the recovery of the copper which the company is mining. The turbine was built by the General Electric Company, Schenectady, N. Y.

From Mansfield, Ohio, it is reported that the Forth Motor Car Company has been incorporated there with a capital of $200,000.

The Fennia Mfg. Company, Hancock, Mich., has been organized to manufacture dials, levels, &c. A factory will be built as soon as the necessary arrangements can be made. Temporary headquarters have been established at 1008 Minnesota street.

The plant of the Alma Mfg. Company, Alma, Mich., is crowded with work, and more men for molding gas engine castings are being taken on.

Foundry supply houses here have been getting out some rush orders for the addition to the plant of the Sterling Foundry Company, Sterling Ill., which is nearing completion.

Among the manufacturers of brass goods whose plant has been busy all through the summer is the American Brass & Iron Company, Detroit, which has a very dependable sort of trade. By another year additional facilities will be necessary.

Purchases will be completed by early fall of tools for the new shops of the Grand Rapids Railway Company, Grand Rapids, Mich.

The Huron Mfg. Company, Ann Arbor, Mich., has had plans prepared by George Scott of that city for a one-story factory, 50 x 250 ft., bids on the construction and equipment of which will be taken shortly.

The Rose Stephens Mfg. Company, whose plant in West Detroit was destroyed by fire early in the summer, will have a fine new factory in operation for the fall trade.

A plant here to which considerable attention has been directed by motor manufacturers is that of the Murphy Chair Company, which is among the best equipped of any in this section for electric drive.

Included in the apparatus which the American Blower Company, Detroit, is offering for use in metallurgical plants are volume blowers for supplying draft to steam boilers, forges, &c., cast iron exhausters for gritty dust of any kind, pressure blowers for furnishing draft to cupolas and forges, disk fans for cooling, removal of fumes, &c. In all of these lines the demand for the first half of the year was extremely good, and prospects for the fall and early winter could hardly be improved upon.

It is reported from Saginaw, Mich., that as a result of the rapidly growing need of the better grades of foundry facings the United States Graphite Company contemplates providing equipment for a larger output.

The purchase of one or more pumping units of moderate capacity is under consideration by the authorities at Coldwater, Mich.

Plans are now in course of preparation for a three-story manufacturing plant of considerable size to be erected by the Howse Commercial Car Company, recently organized here by Chas. F. Howse and others.

Prof. Gardiner S. Williams of the University of Michigan, Ann Arbor, Mich., has been engaged to prepare plans and specifications of the new sewage pumping station at Grand Rapids, Mich.

For pumping engines to be installed at Wyandotte, Mich., the bidders included Keating Bros., Detroit; the Wisconsin Engine Company, Corliss, Wis.; the Laidlaw-Dunn-Gordon Company, Cincinnati, Ohio; the Allis-Chalmers Company, Milwaukee, Wis.; the Snow Steam Pump Company, Buffalo, N. Y., and the Platt Iron Works, Dayton, Ohio.

The Rapid Motor Vehicle Company, Pontiac, Mich., is adding to the force in its experimental department.

Foundations have been completed for the new water works station of this city in which pumping engines having a daily capacity of 145,000,000 gal. will be installed.

The McRace & Roberts Company, Detroit, Mich., manufacturer of steam and brass goods, has increased its capital stock from $195,000 to $395,000, and will soon commence the erection of a new factory which will practically double its present floor space. The factory will be of brick construction, 60 x 320 ft.; a large portion of it is to be three stories. A foundry will occupy the one-story portion of the building, steel trusses being used to support the roof. There will also be a new boiler house in connection with the plant. The company also advises that it may erect another addition in the near future and increase its capital stock to $500,000.

The Ashland Power Company, Ashland, Wis., has secured at Ironwood, Mich., a 10-year street lighting contract and a 30-year franchise for an electric light plant and an interurban street railway to connect the towns of Ironwood, Bessemer and Wakefield. Plans are not yet perfected, but the company expects soon to be in the market for the necessary material for the construction of a 35-mile three-phase transmission line to connect its water power at Brownstone Falls, which it is about to develop, with the three towns mentioned, together with necessary hydroelectric equipment, water wheels, transformers, &c., for the water power development.

The Universal Motor Truck Company, 362 Grand River avenue, Detroit, Mich., has plans prepared for a factory building, 61 x 252 ft., four stories, and a boiler house, 20 x 60 ft., which will be equipped with two boilers and a steam

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vacuum heating system. A 10,000-lb. capacity elevator, 12 x 22 ft., will be installed in the main building.

The Carpenter, Kendall & Naylor Company, Detroit, Mich., has filed articles of incorporation with an authorized capital stock of $10,000. The company will locate at 60-62 Gratiot avenue and will handle factory supplies and machinery on commission.

The Voelkner & Harry Mfg. Company, Detroit, Mich., manufacturer of hardware specialties, dies, tools, metal stampings and plumbing and brass goods specialties, is erecting a new factory, 100 x 120 ft., two stories and basement of reinforced concrete construction. The basement will contain the boiler room and will be used for storing stock. On the first floor will be the offices, metal stamping department, the plating, polishing and buffing rooms, while the second floor will be used for the machine shop, in which will be installed a number of screw machines, lathes, planers, &c.

Milwaukee

MILWAUKEE, WIS., August 15, 1910.

With continued improvement in most directions since last week's report was written, business is rather above normal for the middle of August, and fall trade will unquestionably open strong. Inquiries now in the hands of Wisconsin manufacturers and dealers foreshadow the closing of a liberal number of contracts during the next two or three months, with the probability that a fair percentage of new business will come out in the meanwhile. Indeed, there are some lines in which orders threaten to overrun production. Among the negotiations upon which manufacturers have recently entered are some that involve very large expenditures, and the most encouraging feature of them lies in the fact that they show a complete restoration of confidence on the part of important financial interests in the essential stability of the present industrial situation. There is, in fact, a noteworthy tendency to proceed with large undertakings which, for a number of years at least, will be earning little or nothing and can only be regarded in the light of investments. For these much machinery and other equipment will be required, including usually electrical apparatus so that the advantage to manufacturers here will be very appreciable.

The local market for machine tools is quiet and likely to remain so for an indefinite period. A good deal of purchasing for the new plants now under construction or finished was done during the first six weeks of summer, so that the requirements of the present situation have been pretty fully met. Some buying, however, is being done at this time, and quite a number of orders have recently originated at other industrial centers of the State, notably Racine, Beloit and Janesville. Tool builders here are still occupied with increasing their facilities and have no occasion to worry about new business, which is coming along as fast as required.

Vigorous steps are about to be taken by the local authorities for the abatement of the smoke nuisance. None of the machinery building plants is a serious offender in this respect, but some of the other industries located in the Menominee Valley and along the lake shore, including the Chicago, Milwaukee & St. Paul Railroad shops, have exhausted the patience of the entire city. It needs a campaign of education to show these people the money they are actually wasting in misuse of fuel, and Milwaukee ought to be a good field for missionary effort on the part of manufacturers of smokeless furnaces and smoke eliminating devices.

The S. Freeman & Sons Mfg. Company, Racine, Wis., in addition to a large trade in boilers, which it sells through its own representatives in various parts of the country, is taking numerous orders this year for self-supporting steel stacks, tanks, standpipes, rivetted steel pipe, &c. This has grown to be one of the leading industries of the State, and there is talk in Racine that a large new plant will be built before a great while, as the present shops are crowded to capacity.

The engine department of the Filer & Stowell Company, Milwaukee, is busy on orders from all parts of the country, trade in the Southwest during the first half of the year having been found particularly good. The outlook for fall business is also favorable.

The Allis-Chalmers Company has just won, in litigation with the General Electric Company, an important patent suit, which establishes its right to the manufacture of certain types of electric railroad apparatus, the company having become, within the past six years, an important factor in the field of traction line equipment.

Schmidt Bros. & Hill, Superior, Wis., have been awarded a contract by the Standard Oil Company for the construction of a power plant and repair shop to be used for maintenance of tank cars. The latter will be 50 x 250 ft., with brick walls.

The Dornfeld-Kunert Company, Watertown, Wis., will supply a gas producer and gas engine, the Holt Electric Company, Milwaukee, a dynamo and the Vilter Mfg. Company, Milwaukee, a compressor for the new power plant of Wm. Franzen & Sons of this city.

The Beaver Dam Construction Company, Beaver Dam, Wis., has the contract for erecting the new manufacturing plant at Juneau, Wis., which will be occupied by the Brodesser Motor Truck Company. The operating equipment has been mainly provided for, but some power machinery remains to be purchased.

An additional factory will probably be erected this fall at Gray's Lake, Ill., by the Wisconsin Condensed Milk Company, Burlington, Wis. The equipment is to include boilers and vacuum pans, pumps, &c.

As a result of the activity in mill outfitting the Avery Scale Company, North Milwaukee, Wis., has had an excellent trade this summer all through the West in automatic weighing apparatus, which it furnishes for a variety of service. The demand from other sources is also fair.

The Burdick Electric Company, Milwaukee, has the contract for a generator to be installed in the Kempsmith Mfg. Company's new plant at West Allis, Wis.

W. E. Reynolds, Green Bay, Wis., will erect a large factory for the production of grass mattings. It is to be occupied by the Willow Grass Rug Company.

A two-story factory building, 50 x 90 ft., will be built here by the Leather Company of America. E. Riemenschneider, Milwaukee, is in charge of the plans and specifications.

The Badger Brass Mfg. Company, Kenosha, Wis., has experienced a slight lull in the demand for lamps and other automobile accessories, but trade during the coming fall will undoubtedly be very heavy.

The O. O. Storle Valve Company, Green Bay, Wis., is starting work on a three-story factory building. W. J. Hess is manager. The machinery needed has been provided for.

C. F. Dallman, Antigo, Wis., is building a very compact, portable hoist for the use of contractors and others, which can be operated by a gasoline engine, electric motor, automatic steam engine or belted from any existing source of power.

The Clifton Light & Power Company has been incorporated at Clifton, Wis., to establish a hydroelectric plant, and is now figuring on the construction of a power dam on the Kinnikinic River in St. Croix County.

The Wausau Boiler Works has been awarded the contract for installing boilers and erecting a stack at the municipal pumping plant in Wausau, Wis. The boilers will be furnished by the Murray Mfg. Company.

The Wrought Washer Mfg. Company, Milwaukee, has kept its plant busy thus far this season on orders for wrought and steel plate washers, felloe plates, rivet burs, &c., some good sized orders having been received from leading Western railroads.

The Agato Company, Milwaukee, Wis., has been incorporated with a capital stock of $125,000. The company will manufacture a material which has the appearance of porcelain for interior finish, fountains, &c., and will erect a factory. Temporary officers of the company are: A. Loehndorf, president; Dr. L. W. Booth of Milwaukee, secretary.

The South

NASHVILLE, TENN., August 15, 1910.

In all of Eastern Tennessee and the districts of surrounding States that are immediately continguous there are noteworthy preparations now in progress for development work of various kinds, comprising coal and iron mining, timber cutting, quarrying, clay working and the exploitation of rare minerals, which is likely to be carried on on a larger scale than in any previous season, beginning about the middle of autumn and extending through the winter and spring. For this purpose many new companies have been formed, and others that were organized earlier are about ready to begin operations. Their machinery requirements will, of course, be very considerable. Local representatives of Northern manufacturers or supply houses are taking great pains to cultivate this trade, which is more desirable than ever before for the reason that it includes higher grade equipment than was formerly considered necessary. The economy of using electric power has been so well demonstrated at plants now existing in this section that nearly all contracts for new equipment embody some type of machinery for that purpose. Recent orders from companies such as those mentioned have been placed more largely in Pittsburgh, Cincinnati, New York and other Northern cities than with local agencies, but the business was worked up almost entirely by salesmen located in the South and is credited to them.

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Apart from the buying above referred to, trade remains rather quiet, being mostly of a purely jobbing character. There are, however, indications that it will pick up quite sharply before many weeks have passed, and an excellent fall season is generally anticipated.

James R. Hall, Columbus, Ga., is preparing plans and specifications for an electric generating plant to be built by the Abbe Light & Power Company, at Abbeville, Ala., of about 300 kw. The type of equipment to be used is still to be decided upon.

Electric motors have been installed in the woodworking plant of the Paxton Lumber Company, Bristol, Tenn., and it is stated that other local industries are preparing to follow this example as soon as the new hydroelectric plant now under construction on the Watauga River is completed. Rates for current are then expected to be largely reduced.

Plans for the installation of a pumping plant and water works system are under consideration by the authorities at Meigs, Ga., and a bond issue is proposed to cover the expense.

It is expected that contracts will be let this fall by the Thornton Light & Power Company, Hickory, N. C., for the construction of the proposed hydroelectric plant of 6500 to 7000 kw. Machinery requirements will not be determined upon until some months later.

A manufacturing plant equipped with the most modern machinery will be built at Yazoo City, Miss., by the Delta Table & Chair Company.

A great deal of interest is being taken by auto-vehicle manufacturers and others of this section in an auto logging wagon which is now under construction in the machine shops of the Grant Land & Lumber Company, Selma, La. It is built almost entirely of iron and steel and was designed by the manager of the company, E. E. Fitzgerald. It will be driven by a 40-hp. gasoline motor.

J. B. McCrary & Co., Atlanta, Ga., have been given the complete contract for installing an electric power and pumping plant at Lafayette, Ga., and construction work will begin at once.

The authorities at Waynesboro, Va., have placed an order with the Kennicott Company, Chicago Heights, Ill., for furnishing and erecting a 300,000-gal. steel standpipe. It will be 25 ft. in diameter and 80 ft. high.

The new steel plant of the Allen Engineering Company, Memphis, Tenn., has been completed and is now under operation. The company will manufacture mill supplies and engineering outfits.

St. Louis

ST. LOUIS, August 15, 1910.

Business though rather quiet early in the past week is picking up and shows as good volume as usual at this season. Inquiries are coming in from the South and Southwest quite freely, and considerable business is being figured on, especially in heavy machines. Numerous new concerns are being organized and additions and new plants are being planned by old companies. The leading metal company reports more inquiry for railroad brasses.

The Mississippi Valley Trust Company, St. Louis, Mo., is having plans prepared for a garage 126 x 200 ft., with a machine shop L, 30 x 139 ft., giving an aggregate floor space of about 30,000 sq. ft. The building will be of brick and steel construction, and will be equipped with a steam heating plant and electric connections. A portion of the building has been leased to the Columbia Taxicab Company, St. Louis.

The Board of Public Improvements will receive sealed proposals for furnishing all materials, tools and labor necessary for new toilets to be located in the basement of the Library Building at the St. Louis Industrial School.

Hemp & Co., since 1862 manufacturers of sheet metal goods, air tight stoves and stove pipes, will locate at Vandeventer avenue, on the Oak Hill branch of the Iron Mountain Railroad. The new plant will consist of three large brick, two and three story buildings, will have 125,000 sq. ft. and will cost in the neighborhood of $100,000. About 300 factory hands will be employed.

The American Concrete & Street Railroad Tie Company will erect a plant to cover 5 acres at a cost of $150,000, and employ 500 workmen. B. M. Bullard is president and W. R. Powell, secretary, with offices in the Central National Bank Building. The product of the new concern is a patented tie, made in two parts and connected by a steel binder.

The American Diesel Engine Company, 2925 South Broadway, is planning to erect a $3,000,000 manufacturing plant in this city. Adolphus Busch is largely interested in this company, which controls the American rights to the Diesel oil engine. It is expected to revolutionize many power plants, as the engine uses petroleum residue. James R. Harris is the manager of the company.

The Gardner Machine Company, South Beloit, Ill., has been incorporated, capital stock $100,000; incorporators—F. N. Gardner, F. E. Gardner and L. Waldo Thompson.

The Williams All-Service Car-Door Company, Clinton, Ill., has been incorporated, capital stock $600,000; incorporators—Walter Scott Williams, Charles R. Westcott and William H. H. Hastings.

The Andrews Wire & Iron Works, Rockford, Ill., has filed notice of an increase in capital stock from $20,000 to $140,000.

The United States Mail Chute Equipment Company, St. Louis, certifies to an increase in capital stock from $50,000 to $75,000.

The Illinois Glass Company, Alton, Ill., has completed installing the first automatic glass blowing machine ever used. It is expected the automatic machines will be in operation within two weeks. Blowers are dispensed with in the use of the new machines.

An explosion of starch by spontaneous combustion at the glucose plant at Granite City, Ill., occasioned a loss of $55,000. The three top stories of the six-story building were completely wrecked. One man was killed and several men injured.

The factory of the St. Louis Axle Company was destroyed by fire August 9. The loss on the building was placed at $10,000, and $20,000 to the machinery of the plant. The company makes steel vehicle axles.

The Board of Public Improvements awarded a contract for erecting a second tier of steel cells at the workhouse to the Pauly Jailbuilding Company at a cost of $8300.

The Johnson Wireless, Holding & Mfg. Company, St. Louis, has been incorporated, capital stock $100,000; incorporators—Charles P. Johnson, Ralph Jones, Alexander Young and others. To manufacture and deal in devices for wireless telephones, &c.

The Warlic Heater Mfg. Company, St. Louis, has been incorporated; capital stock, fully paid, $100,000; incorporators—Walter J. Warner, Daniel A. Lichty, J. C. Taylor and James L. Hopkins; to manufacture and deal in heat producing appliances.

The Ferd Bauer Engineering & Contracting Company, St. Louis, has been incorporated; capital stock, fully paid, $50,000; incorporators—Gustav L. Mattern of Chicago, Ferdinand Bauer, Martha Bauer and Margaret Lawless; to manufacture and deal in refrigerating machinery, &c.

The Peerless Folding Bucket & Mfg. Company, St. Louis, has been incorporated; capital stock $25,000, fully paid; incorporators—S. R. Corbett and L. D. Murrill of Memphis, Tenn.; R. C. Powell of Kirkwood, Mo., and A. W. Slayback of St. Louis; to manufacture and deal in buckets.

The Witthcefft-Krusz Concrete Forms & Construction Company, St. Louis, has been incorporated; capital stock $100,000; incorporators—Philip Kruez, Otto Schultes and Wm. Grond; to manufacture and deal in concrete forms.

The Missouri Briquette Machine Company, St. Louis, has been incorporated; capital stock $50,000; incorporators—Frederick R. Cornwall, David R. Francis, John Scullin and others; to do a general manufacturing business, particularly briquette machines.

The St. Louis Cash Register Company is the business name of a new concern which is starting up in a small way, with equipment recently installed.

The Lead Products Company, recently removed here from Kansas City, Mo., manufacturer of red lead, litharge, &c., has its plant in running order again after it recent fire, and has been adding some new machinery.

The W. R. Knight Machinery Company, manufacturer of vertical milling machines, finds business very satisfactory for this season, and notices, particularly, a decided improvement in the demand from Europe.

The Wrought Iron Range Company, manufacturer of kitchen and hotel ranges, furnaces, &c., is getting ready to build a large new plant, as at its present location other lines of business are encroaching and thus prevent an extension.

The Southwest

KANSAS CITY, MO., August 15, 1910.

With the approach of autumn business in the leading trade centers of the Southwest shows a marked tendency to develop along the lines recently indicated in this report. Orders for machinery are still backward, but a good deal of correspondence is now in progress between prospective buyers and sellers, and estimates on the cost of equipping or remodeling power plants, mills, shops and factories have been called for recently to a greater extent than at any time since the close of spring purchasing. Jobbing houses and Eastern manufacturers having warehouses in this territory are also accumulating stocks of machinery and supplies in preparation for prompt deliveries when the regular fall movement sets in. Salesmen for supply houses who call

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frequently at the various local plants report that most of these are very busy, and confirmation of this comes from a number of different sources. Sheet metal and repair work is a feature of the present situation, many shops having enough of the latter to compel considerable overtime labor.

In view of the assertions frequently made, of late, that the automobile industry is prospering at the expense of other lines of trade, the following statement attributed to J. W. Perry, president of the National Bank of Commerce, Kansas City, is interesting: I do not know of one instance, he says, where a man has mortgaged his home to buy a motor car. There is a lot of buncombe about the idea that our financial condition is threatened by motor car extravagance. It is now an economic proposition. We move merchandise in motor cars and motor trucks and save money by it. I believe the motor car is to become a great factor in commerce.

The contract for installing an electric power plant has just been let by the Snyder Ice, Light & Power Company, Synder, Texas.

An elevated steel tank to hold 165,000 gal. will be erected by the Chicago, Rock Island & Pacific Railway at Little Rock, Ark., in connection with a projected roundhouse. A coal handling plant, with track scale, cinder pit, &c., is also to be installed.

An electric generating set will be purchased in the near future by the city of De Soto, Mo., for installation in connection with the pumping plant.

A crushing plant equipped with five stamps has been erected by the Big Butte Mining Company, Prescott, Ariz., and other machinery will be required as the property is developed. Shaft sinking is now in progress.

The Continental Power Development Company, organized by W. E. Bradford, Versailles, Mo., who is secretary, will have plans prepared for a large hydroelectric plant.

The construction of an electric power and pumping station, equipped with the best modern machinery, is under consideration by the municipal authorities at Bryan, Texas.

The Campbell Heating Company, through its Kansas City sales offices, is putting on the market here a line of apparatus which has a number of unique features, and has been very extensively placed this season all through the Southwest, being one of the most active lines in this territory at the present time.

The American Light & Water Company, Kansas City, has been awarded the contract for constructing a pumping plant and distributing system at Vale, Ore. A gas engine driven pump will be used as the initial unit, and this will serve as an auxiliary later on when the proposed gravity system is completed.

It is reported from McCrery, Ark., that the A. Langton Mfg. Company, Terre Haute, Ind., has put in operation a new timber cutting plant.

The Ober-Nester Glass Company, Kansas City, is arranging for the erection of a new factory building.

The Tucson Gas, Electric Light & Power Company, Tucson, Ariz., which has generating units with a capacity of 400 kw., has engaged an Eastern engineering firm to plan extensive improvements in its system, involving the purchase of some new machinery.

A new woodworking plant has been completed and put in operation by the Southwestern Veneer Company at Cotton Plant, Ark.

J. E. Knotts, Guanacevi, Mexico, is contemplating the installation of a 50 or 75 kw. three-phase 2200-volt 60-cycle generator connected to engine in his mill for furnishing electric current for light and power throughout the city. About three miles of transmission line will be erected and street lighting system installed.

San Francisco

SAN FRANCISCO, August 10, 1910.

Road machinery continues active, new types especially being in strong demand, and no curtailment is anticipated before the beginning of the rainy season. Considerable equipment is also required for railroad construction in various parts of the State. Mining machinery has been rather quiet during the summer, but the movement is beginning to increase to some extent. The foreign business in this line continues to be a prominent feature, frequent shipments being made to points in Mexico and South America. Several dredgers, both for mining and reclamation purposes, are being constructed, and it is expected that a local firm will get a contract for a ladder dredge for the Isthmian Canal Commission.

The Empire Investment Company is preparing to install a large pumping plant to irrigate a tract of land near Lemoore, Cal.

The town of Santa Barbara, Cal., is in the market for pumping equipment for use in connection with the sewer system.

The Crown City Flour Milling Company is having plans drawn for a milling plant at Pasadena, Cal.

The town of Lodi, Cal., is planning to replace its water works pumping plant with an entire new outfit, including two 100-hp. gasoline engines, electric generator, &c.

An order from the Government is expected about the end of the month for a steam hammer, water tube boilers, and other equipment for the use of the Mare Island, Cal., navy yard.

The Aiken Company, operating a rock quarry near Bakersfield, Cal., will install a large crusher, revolving screens, &c., in the near future.

The Hanford Foundry, Coalings, Cal., was damaged by fire to the extent of about $1500 on July 29.

The Silica Brick Company, Sacramento, Cal., has placed contracts for new machinery amounting to about $22,000.

The Marysville Gold Dredging Company is preparing to build a new mining dredge on its property at Marigold, Cal.

S. H. Hatcher is planning to install an ice manufacturing plant of about 100 tons daily capacity at Sacramento, Cal.

The Pittsburg Foundry Company has filed articles of incorporation at Los Angeles, Cal., with a capital stock of $25,000. The incorporators are F. E. Burger, H. P. Burger, W. Burger and H. E. Colby.

The Hamilton Motor Company has been incorporated at Pasadena, Cal., with a capital stock of $50,000 by E. J. Pyle, A. A. Genereaux, E. W. Leslie, N. W. and A. G. Hamilton.

O. F. Metz, formerly connected with the Pacific Gas & Electric Company, has joined the staff of W. S. Heger, Pacific Coast manager for the Allis-Chalmers Company.

The Los Angeles Brick Company has plans under way for an addition to its plant at Richmond, Cal., the machinery for which will cost about $50,000, and will include several classes of modern brick making equipment.

The Northern Electric Railway Company, San Francisco, Cal., is contemplating the erection of new shops and new terminals at West Sacramento, Cal., but plans are not sufficiently developed to give detailed information.

The Grandiean Gas Machine Company, San Diego, Cal., is seeking a factory site for the construction of a plant to manufacture a recently perfected gas machine. At present the company is having its products manufactured under contracts.

The Farther Central West

OMAHA, NEB., August 15, 1910.

There are indications all through this Western country that fall trade will be very brisk, as decisions in relation to new equipment have been delayed during the summer, and they will have to be made very shortly if important work is not to be held up. The hot, dry weather caused business of all kinds to drag, and there has been considerable worry over the crops; but it is now apparent that there will be plenty of money in circulation after the early movement of grain takes place, and local industries are likely to flourish. For the next few weeks, however, the only buying of importance will be of machinery of general utility, including power and pumping units, accompanied by the usual miscellaneous demand. It is essentially a jobbers' and dealers' market, with business transacted more by mail than through visits of salesmen to customers.

The Standard Bridge Company, Omaha, has taken an important contract for the erection and maintenance of bridges in the vicinity of Fairfax, S. D.

The Superior Electric Light & Power Company, Superior, Neb., is planning to enlarge its plant and extend the distribution system. Equipment now in service comprises three alternating current generators of 150 kw., driven from hydraulic turbines built by J. Leffel & Co., Springfield, Ohio.

A plant for concentrating tungsten ore will be built in the vicinity of Boulder, Colo., by Smith & Ardouvel, who are operating a mine there. The plans include use of electric motors for driving the machinery.

A new boiler is being ordered for the municipal plant at Wymore, Neb., and some additional apparatus may be purchased.

The Davenport Locomotive Works, Davenport, Iowa, is largely extending its business in the industrial districts of the Ohio River valley and contiguous territory. For that section of the country the Pittsburgh Machinery & Equipment Company, Pittsburgh, was recently appointed sales agent.

The municipal power plant at West Liberty, Iowa, is to be enlarged and a new Corliss engine unit of 150 kw. installed. The present equipment is driven from an engine furnished by the Murray Iron Works Company, Burlington, Iowa.

An electric plant at Van Horne, Iowa, will be taken

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over and improved by the Van Horne Electric Light & Power Company, recently organized there for the purpose.

A motor driven pump of 2,000,000 gal. daily capacity is to be installed at Lincoln, Neb.

The Monarch Engineering Company, Falls City, Neb., has taken the contract for constructing a bridge across the Salinas River in the vicinity of Metz, Cal.

Before the advent of another season the output of the Plymouth Clay Products Company, Ft. Dodge, Iowa, which has recently been inadequate to the demand, will be enlarged by the installation of additional machinery.

The Interstate Electric & Mfg. Company, Sioux City, Iowa, has entered the field as a combination of the Inter-State Electric Mfg. Company and the Interstate Supply Company, whose business it will continue.

Equipment recently installed by the Sliver Bros. Iron Works Company, Salt Lake City, includes a high speed steel saw for cutting beams, channels, angles, &c., which was furnished by Jos. T. Ryerson & Son, Chicago. It is driven by a direct current electric motor of 20 hp.

One of the heaviest dealers in iron and other metal scrap in the mountain States is the Utah Junk Company, Salt Lake City, Utah, which has recently been making extensive shipments to the nearest furnaces.

Business in low pressure boilers for heating systems has been found very good all through the summer by the McDonnell Boiler & Iron Works, Des Moines, Iowa. Prospects for fall trade are excellent.

The Bridgeport Electric & Power Company, Bridgeport, Neb., organized with a capital stock of $25,000, will install in the near future an electric light and power plant, and possibly a water works system.

The Northwest

ST. PAUL, MINN., August 15, 1910.

A fair amount of business continues to be done by manufacturers and dealers in this part of the country, and a number of projects for new factory buildings, including two motor vehicle plants, are now maturing, with a view to starting construction work by or before the middle of the fall season. Contractors' equipment is still being ordered to an appreciable extent, notwithstanding the lateness of the season. Railroads with terminals on the Pacific Coast have taken some machinery lately, together with large quantities of miscellaneous supplies, and there has also been a limited amount of purchasing by the lines that traverse the Northwestern grain fields. Among industrial establishments, the best demand for mechanical equipment comes from manufacturers of flour, cereals, household necessities, small patented specialties, &c., with every prospect that this will be well sustained for some weeks to come.

Webster Wheelock, whose office is in the Hackney Building, St. Paul, has ordered plans prepared for a central power plant, located in one of the manufacturing districts, which will furnish electric current for operating the machinery in a number of industrial plants of the vicinity. The details of equipment will be taken up after building contracts have been let.

A hydroelectric plant to furnish power for operating motors at the mine and concentrating mill is being constructed by the Mines Company, Ltd., Wallace, Idaho.

Contracts for the installation of a municipal electric station for power and lighting at Britton, S. D., were recently let.

The Olson-Boettger Electric Mfg. Company, St. Paul, is having a good trade this summer in small motors and detail apparatus of various kinds.

The Minneapolis Electric & Construction Company, Minneapolis, is putting on the market a wire measuring machine, which performs reeling and measuring in one operation.

Machinery including a hoist, compressor and pumping unit will be installed in the near future on the property of the Big Baldy Mining Company, Wallace, Idaho.

The Oliver Iron Mining Company is putting in a water supply system at Gilbert, Minn. A public service franchise will probably be granted by the local authorities to a corporation formed for the purpose of installing an electric power plant.

The capital stock of the Northwestern Electric Equipment Company, St. Paul, has been increased to $600,000.

It is reported from Hill City, S. D., that E. O. Johnson, who is working the Gertie mine at that place, has had built after his own design an ore crusher which resembles the tube mill in form but uses iron rollers in place of flint pebbles. It was built in the machine shops of the Homestake Mining Company at Lead, S. D.

A car replacer which has come into service in the Northwest is manufactured by the Washburn Steel Castings & Coupler Company, Minneapolis. It is cast in steel, with a clip which hooks over the ball of the rail, holding the device in position and preventing the wheel of a car or locomotive from crowding it away. The outside replacer is also provided with grooves to direct the flange of the wheel over the top of the rail and bring the flange to its position on the inside of the track. This mechanism is also being extensively introduced in other parts of the country.

Plans for hydroelectric developments on tributaries of the St. Louis River that aggregate 75,000 hp. are gradually being matured by the Minnesota Canal & Power Company, Duluth, Minn., which has just been granted permission by the State to use public lands for the sites of storage reservoirs. The company will enter into competition with the Great Northern Power Company, which has a plant of 40,000 hp. on the St. Louis River at Thomson, Minn., its headquarters being also in Duluth.

A new manufacturing plant, 50 x 140 ft., will be built in St. Paul for the O'Donnell Shoe Company, now located at Sixth and Wacouta streets. It is to be completed by November 1.

G. W. Mitchell, Winner, N. D., has organized a company to build a pumping plant for public service.

The Linder Mfg. Company, Minneapolis, has built up a large trade, at numerous points in the Northwest, in structural and ornamental iron, the demand for which this season has kept its fabricating plant running to full capacity.

The town of West Liberty, Iowa, has recently let contracts for new equipment for a lighting plant, and is considering the purchase of a deep well pump.

The Eureka Stone & Ore Crusher Company, Cedar Rapids, Iowa, manufacturer of the Mitchell improved crushers, is considering the erection of an addition to its plant, approximating 60 x 140 ft., two stories, of brick and steel construction. Details of equipment to be installed have not been worked out.

The Standard Mfg. Company, Cedar Falls, Iowa, recently incorporated will manufacture farm and railroad gates and other farm labor saving devices. The company has its plant fully equipped, but will erect an addition within the next year and purchase additional machinery. Electric power with individual motors is now being used. The company is now operating sensitive drill presses, power punches and presses, and special machinery for working tubing into various shapes.

Sealed bids will be received until August 25 by the city of New Ulm, Minn., for furnishing all material and labor for laying water mains, placing gates and hydrants and making connections, also furnishing and installing a pneumatic water tank with a pump, motor and automatic starting device for the Dr. Martin Luther College.

The Grant & Wood Ball Department.—The Grant & Wood Mfg. Company, Chelsea, Mich., is erecting a building which will be used exclusively for oil and dry grinding of steel balls. The building will be 50 x 200 ft., one story, saw tooth roof construction, and will be equipped with sprinkler and hot water heating systems. The grinders to be installed were especially designed by John J. Grant, the company's consulting engineer, who has been identified with the ball industry both in America and abroad since the business was first started. Mr. Grant has also perfected a process whereby the company expects to greatly improve the quality of steel balls as compared with those heretofore manufactured. The new building, together with others already erected, will give the company capacity for a large output of this product, besides all grades of special alloy steel, brass and other composition balls.

The Hawley Down Draft Furnace Company is now moving into its new factory, located at Monroe and Des Plaines streets, Chicago. The entire machine shop contract was let to the Niles-Bement-Pond Company, the lathes being of Pratt & Whitney make. The forge department is being fitted out by the E. W. Bliss Company. The new plant will be modern in every respect and will be operated by electricity, the motors being furnished by the General Electric Company.

The Globe Seamless Steel Tubes Company, Milwaukee, has appointed the Kirby Equipment Company, 652 Railway Exchange Building, Chicago, its sales representative for the West.

Personal

Charles Whiting Baker, editor of the *Engineering News*, New York, was taken ill with fever while at Birmingham, England, in July, attending the congress of the Mechanical Engineers. His return to the United States will probably be delayed several weeks.

Joseph Riter, vice-president of the Riter-Conley Mfg. Company, Pittsburgh, has been very ill at Amsterdam, Holland, where he underwent an operation for appendicitis. He is reported to be recovering. Gilbert Fletcher, president of the company, has gone to Amsterdam to remain with Mr. Riter during his illness.

George R. Bennett, formerly associated with McDowell, Stocker & Co., Chicago, machinery merchants, has resigned from that connection and is now identified with Edgar Allen & Co., Ltd., manufacturers of tool steels, &c., with his headquarters in their Chicago office.

Isaac L. Ellwood, who for years was a very prominent figure in the barb wire trade, is seriously ill at his country home in De Kalb, Ill.

W. C. Royce, formerly with the Firth-Sterling Steel Company, has been appointed general sales agent for the Vanadium-Alloys Steel Company, with offices in Cleveland, Ohio.

E. L. Ryerson, president of Joseph T. Ryerson & Son, Chicago, recently sailed for Europe, to be absent several months.

R. L. Parrish, Covington, Va., president of the Oriskany Ore & Iron Corporation, has returned from a trip to Europe.

F. S. Witherbee, president of Witherbee, Sherman & Co., Inc., New York, sails for Europe early in September.

Charles W. Mouch, president of the Indiana Rolling Mill Company, Newcastle, Ind., has been elected president of the Farmers' National Bank of that city.

H. S. Stebbins of Oglebay, Norton & Co., Cleveland, who was recently severely injured in an automobile accident, is recovering slowly at his country home in Willoughby, Ohio. It will be several weeks until he will be able to take up his duties.

G. H. Jones, vice-president of the Inland Steel Company, Chicago, sailed for Europe August 13, from New York. He will visit his mother in England and will make a brief tour of the Continent, expecting to return to Chicago in about six weeks.

D. C. Snow and E. A. Pridmore, well known to the foundry trade from their connection with the firm of Henry E. Pridmore, Chicago, manufacturer of molding machines, are, on account of change in ownership, no longer connected with the business.

The Jones & Laughlin Steel Company, Pittsburgh, Pa., early last week placed in operation its new rod mill at Aliquippa, Pa.; being a new mill the output at first will be light, but it will be gradually increased until its full capacity is reached. The tin plate mills of this company at the Aliquippa Works, which have been operated now for some time, are to be gaited to full capacity, having business booked that will insure operation for several months. The fourth new blast furnace at Aliquippa is nearing completion and is expected to be blown in within the next three or four weeks.

The Kilbourne & Jacobs Mfg. Company, Columbus, Ohio, has received an order for 500 gondola cars for use by the Illinois Tunnel Company, Chicago. They are small double truck cars, each having a capacity of 15,000 lb. They are to be of all steel construction, equipped with Andrews small size side frames and bolsters, and will be used for conveying freight. They are to be drawn by electric locomotives.

Obituary

WILLIAM H. SILVERTHORNE, New York, president of the Railway Steel Spring Company, died at his summer home near Mentor, Ohio, August 13, aged 60 years. He had been ill for some months. His boyhood and most of his business life were passed at Cleveland. He went to work in the Lake Shore Railroad shops after taking part of the public school course and later was a clerk in the office of the Amherst Stove Company. Then he became a salesman for the Winslow Roofing Company, which was formed to manufacture steel roofs for cars, and from that became connected with the Paige Car Wheel Company of Cleveland, which successfully developed a steel tired car wheel. In 1902 this company was taken over by the Railway Steel Spring Company, the capital of which was finally increased to $40,000,000. For some years Mr. Silverthorne had been a resident of New York. He had some interest in the Safety Car Heating & Lighting Company.

CHARLES RIDGELY, who was president of the Springfield Iron Company until its merger in the Republic Iron & Steel Company, died at Springfield, Ill., August 11, aged 74 years. He was born in Springfield and was active all his life in banking and industrial affairs. He was a director of the Wabash Railroad from 1875 to 1885, and for many years was president of the Consolidated Coal Company, which he organized for Jay Gould. His father, Nicholas H. Ridgely, was the first banker in Springfield, and Charles Ridgely at his death was vice-president of the Ridgely National Bank. In 1886 he declined the position of Comptroller of the Currency, which was offered him by President Cleveland. He was the father of William Barret Ridgely, who recently held this position at Washington.

ALBERT SPIES, who for many years was editor of *Cassier's Magazine*, and recently proprietor and editor of the *Foundry News*, died of apoplexy at his home in Jersey City, N. J., August 16. He was a graduate of Stevens Institute and a member of the American Society of Mechanical Engineers. His introduction into journalism began shortly after his graduation, when he joined the editorial staff of *The Iron Age*, serving in this capacity for several years. He leaves a widow and one son.

CHARLES P. CARTER, an inventor, known especially for his invention of the apple parer, died suddenly in his shop in Kingston, N. Y., August 13, while working on a new device for safes. He was 75 years old.

The Stiles Mfg. Company, Parkersburg, W. Va., has taken over an old plant located there, which includes a foundry for making brass, iron and aluminum castings and a completely equipped machine shop for the manufacture of large and small cut gears and special machine work. It has received important contracts for the manufacture of belt sanding machines for the Oakley & Jansen Machinery Company, and wood steaming retorts for the Perfection Wood Steaming Retort Company, both of Parkersburg. Stock facilities enable the carrying of a full line of mill supplies for prompt shipment. Robert G. Stiles is president; W. H. Westerman, vice-president and manager; Albert M. Stiles, secretary, and Samuel B. Stiles, treasurer.

Correction.—In the article entitled "Condensers for Small Central Stations," printed in *The Iron Age*, August 11, 1910, the lower part of Fig 9 shown on page 340 was misplaced. It should have formed the lower portion of Fig. 12, page 341, as it was an enlargement of the loop marked "bottom" at the left end of the indicator diagram.

The Expense of Nonproducers

Some Contrasts Between Office and Shop Standards of Efficiency

BY F. W. BRADY.

The most modern industrial conditions have apparently established the utility and ultimate economy of the most elaborate and detailed methods of determining the cost of production in manufacturing enterprises, although there is some extra expense involved. Many still object to the salaries paid in the cost department, believing that the information secured and tabulated—with the possible exception of jobs for which the customer is to be charged by the hour—forms no part of direct business operations and results in little but added cares and perplexities.

Ignoring the business procedure of the day, there are many manufacturers who would prefer to determine the progress of a year's business by deducting their gross disbursements from the total receipts; and, were it not for open accounts, payable and receivable, and could a combination of absolute honesty and infallibility be embodied in employees, all accounting expense could be eliminated and wealth and prosperity determined on a sheet from a pad.

However, the cost system as applied to production is coming into its own, although the possible future converts are large in number and strong in prejudice. None can dispute the fact that a cost system properly designed for its especial purpose, intelligently installed and maintained by competent directors is a positive means of eliminating a vast amount of guesswork in fixing selling prices, anticipating future conditions and meeting competition.

With all the attention concentrated on production, its cost, quantity and quality—a never ending search for a saving of a half-minute of time or the smallest fraction of a cent, by either labor saving tools or arrangements for handling material in the shop—it is not surprising that many other items of expense in manufacturing receive but cursory and intermittent investigation. Among these may be mentioned cost of the commercial administration and the clerical force therefor; expense of procuring new business in the various sections which the concern invades; interest and discount; salaries paid for no actual service received.

Opposition to the Expense of New Methods

There still exists a type of manufacturer who has an inborn revulsion against the expense which comes hand-in-hand with modern fixtures and changed methods. Increase in efficiency in any department, if not overburdened with systems, is a latent asset even though it cannot be posted in the books with a definite cash value. Sentiment also plays an important part in some cases, and such an argument as the following is not unusual: A prosperous manufacturer whose attention was called to the great contrast between his plant and the balance of his establishment made the statement that he had allowed very modern young men to sweep him out of his shop, but he positively would not change all his office methods, which had made him money all these years, and part with the only link connecting him with the past. He didn't propose to ask permission of his manager to have his desk stay in its old place.

In the nonproductive branches the majority of employees are salaried and their expense is fixed irrespective of the amount of labor they perform. Their output cannot be weighed in avoirdupois and is not susceptible to the radical betterments we find possible in the shop. Therefore, in studying the office situation, the problem to be met is to secure the maximum efficiency with the smallest consistent payroll.

Office Conditions Less Sharply Scrutinized

Another plausible excuse for the neglect of this phase of an enterprise is the customary small ratio of nonproducers to the total working force, even though the number of the former may be out of all proportion to actual necessities. Every eye is turned toward the shop, and in many instances no attention paid to the commercial help as to punctuality in reporting for the morning's duties; to the listless start of operations at that time; to the early preparations for the dinner hour; overstaying the allotted time for the mid-day meal; the many excuses for absence and days off, with pay; vacations in the summer season; interest in ball games, horse racing, &c.; pools and betting on uncertain future events; the everlasting "joshing" and prank playing during hours on the least provocation. These are a few of the sundry irregularities which would not be tolerated in the shop by either the superintendent or the proprietor himself, who has these conditions under his personal observation. The employees are not to be held guilty of improper service if their duties are not so regulated that they are constantly engaged.

It is not uncommon to find in a large industry, in which the shops are being crowded to the limit of capacity, without a space for a breath between operations, more or less of the office force killing time in consequence of a poor subdivision of the work in hand, or a slip in the layout of the day's duties which the executive of the department has not anticipated and met.

No Parallel to Shop Efficiency

Again, the "atmosphere" of the shop and that of the office are quite different. In the former every man has been trained from the first to be actually, or appear to be, engaged during every minute of the working day. The nonproducer is inclined to view his service otherwise, and without any particular force or inducement to push his work through, plods along at about 50 per cent. efficiency much of the time, or with pulsations of great vigor during a "rush," with periods of idleness intervening.

When the employees are not fully engaged, there are three faults to be studied: the whole force collectively or some of its parts may be too large for the enterprise; the work is not apportioned and distributed with a uniform thickness; the executive's attention is diverted from the details of his department to such an extent that their close study is prevented. In the last case, it is economy to provide for extra supervision, even though expenses may be increased.

How frequently we find the stockroom of the shop in the care of competent clerks; complete records of every ounce of material incoming and outgoing, with proper debits and credits on orders or jobs; an attempt at a perpetual inventory, &c. In the office the customary stockroom is a closet or receptacle in charge of the office boy, whose recollection of material passed out is the sole record; or, worse still, is the case where material is accessible to every employee at will. While the cash in the office is carefully guarded, postage stamps are often indiscriminately handled without any check on the number or weight of pieces mailed. The purpose of shop systems is not primarily to check dishonesty, but to prevent wastes and increase efficiency. Therefore, we would expect the same arguments to apply in the case of the commercial divisions.

Improvements in organizations always involve some cost in addition to a close study of every phase of the situation. The workings of the forces should be under observation for a considerable period, and careful records made of any irregularities in the rou-

tine, just as we watch an engine performance or the output from a group of tools. All mechanical combinations operate at maximum efficiency when under a uniform load approximating that for which they are designed; especially does this apply to those which consume fuel or utilize energy from such combustion. Why is not the human structure similarly regarded, and the same principles applied throughout? Employees under a reasonable stress are ultimately more competent, happier and more ambitious if there are not periods of hysterical rush, nor those given over to watching the clock. Business life indoors should not be influenced by the conditions of temperature without, humidity, depth of snow, protracted wet or dry spells, approaching holidays, or other causes which seem, in many instances, to be the pacemakers for daily activities. In the summer we find a high temperature an excuse for postponing all matters of importance, yet the one who suffers least from heat is he that is too busy to note it. A sharp thunderstorm in the average office will reduce efficiency to about 20 per cent. as a result of the customary methods therein, while during the same outburst the shop production maintains its average.

Office Reforms Take Time and Study

Like other ailments, the deformity of the average office administration is not susceptible to quick cure, nor will one remedy apply to all cases. The keen executive and close observer can go into the shops and absorb some of the spirit therein and transfer some of the fundamental principles he finds, to his dominion, with good results. His output will be increased and his costs reduced, and with due regard to the class of help under his care, his organization will be better pleased with itself and more pleasing to the proprietors. The adoption of labor-saving devices will not in itself bring about the proper results or economies.

The application of stringent measures to the commercial departments to bring about a radical change means the elimination of female employees—a procedure which, in the writer's opinion, cannot be put in force too soon.

The Lozier Motor Company's Plants.—It has been reported that the works of the Lozier Motor Company at Plattsburg, N. Y., would be abandoned, but this is an error. Two large additions to this plant have been built within the past year; 80 per cent. of the machinery is less than three years old; it has a capacity of over 600 complete Lozier cars per year, and it will be operated as heretofore to the fullest extent. On October 1, however, the new Detroit plant will be in operation and complete Lozier cars will only be turned out there; but at that time the Plattsburg plant will specialize in building various parts for the Lozier car which will be supplied to the Detroit plant. These parts will consist of castings, the major portion of the transmission and a greater part of the machine screw work. In this way both the Detroit and Plattsburg factories will work to the fullest extent in conjunction.

The Iron City Coal & Coke Company's Enlarged Sales Office.—G. W. Wilson, vice-president of the Iron City Coal & Coke Company, Pittsburgh, Pa., has purchased the Herriott Coal Company property at New House, Ohio, on the Pittsburgh, Lisbon & Western Railroad, and has incorporated a company under the laws of the State of Ohio known as the Wilson Coal Company. The officers are G. W. Wilson, president; S. V. D. Huntington, secretary; H. H. Hodge, treasurer. The property consists of 250 acres, with a modern electrical equipment. The mine has a capacity of 300 tons per day. The output will be handled by the Iron City Coal & Coke Company, which latter company contemplates opening a branch office in Cleveland, Ohio. This company recently opened branch offices at Philadelphia, Pa., and Toronto, Ont. W. W. Peabody is Eastern sales agent and W. F. Marshall Canadian sales agent. H. H. Hodge is sales agent, main office Pittsburgh, Pa.

The Mattagami River Iron Ore Field

TORONTO, August 15, 1910.—Professor Baker, who was sent to the Mattagami River region by the Government to examine the lignite and iron ore deposits, has returned after spending several weeks there. Nothing official has yet been given out as to his opinion of the ore field. It is said, however, that the exposed iron is of the limonite variety, and this is taken to mean that, below the surface, the ore is hematite. One body is said to be 1800 ft. long and of a known depth of 35 ft. This body is described as quite as promising a property as the Helen mine in the Michipicote district. There are several other properties of which glowing accounts are given by persons who may be interested. Several syndicates reported to be financially strong have taken up iron lands there and have sent up parties to explore them. Claims covering an area of as much as 700 acres have been acquired by a single syndicate in a number of cases. A very large party left toward the end of last month to look over certain of the properties. As has been mentioned in former letters, the field is not far from the lines of railroad that have been pushed across the hight of land and into the Hudson Bay slope of the continent. It is about 75 miles from Cochrane, the present northern terminal point on the Temiskaming & Northern Ontario Railway, a road built, owned and operated by the government of the province. The National Transcontinental Railway, which is being built by the Dominion Government, but which is to be operated by the Grand Trunk Pacific, also passes through Cochrane. There are believed to be great quantities of iron located in deposits scattered over the country about Hudson Bay, and the prediction has been made that that region will be the source of the raw material for a great Canadian iron and steel industry. C. A. C. J.

Modern Ore and Coal Handling Machinery.—Under the above title the Brown Hoisting Machinery Company, Cleveland, has issued an unusually elaborate pamphlet, 8 x 11 in. It consists largely of full page illustrations of installations of Brownhoist machinery that have gone into service since the issuance of the company's last catalogue. No attempt is made to give a detailed description of the machinery, the amount of material each unit will handle or records that have been made. A few introductory pages illustrate the development of ore and coal handling machinery. The first view is a scene at lower lake docks in the old days, when the ore was shoveled out of the hold of the vessel and wheeled on to the dock in barrows. This is followed by a view of three bridge tramways built for the New York, Lake Erie & Western Railroad Company's dock at Cleveland in 1883. In succession are shown a furnace hoist built in 1885, the first bridge tramways with cantilevers, built in 1886 at Ashtabula, and the first "fast plant" built for M. A. Hanna & Co., Cleveland, in 1890.

The Stark Rolling Mill Company, Canton, Ohio, furnished the novel *menu* cards at the annual banquet of the Master Sheet Metal Workers' Association, held at the Hotel Walton, Philadelphia, Pa., on the evening of August 11. The cards were galvanized sheets of the company's rust-resisting Toncan metal, on which the *menu* was printed in three colors. The courses had trade designations of an entertaining character. The entire conception was ingenious and exceedingly clever.

By-Product Ovens in America and Europe

Practice at Plants Operated in Connection with Iron and Steel Works

BY F. E. LUCAS*

So much has been written about the waste of natural resources in America that it seems almost useless to add to it. But the fact remains that due to this waste we have to face problems and conditions to-day that did not seem to have occurred to our forefathers. Dealing with coal alone, from the standpoint of iron and steel manufacture, we find that in the last few decades, while such giant strides have been made in America in building up a magnificent steel industry, millions of dollars have been lost by making coke in beehive ovens—lost through the lower yield of coke obtained in comparison with by-product ovens, and lost in the gas that has been allowed to escape into the air, most of it without even raising the steam necessary to run the plant.

To-day steel makers are facing the problem of making pig iron and steel at a cost that will give a reasonable profit without raising the price too high and so killing the market. The day of 60 per cent. ore is about passed, and consequently the quantity of coke used per ton of iron made is higher. The ore from most mines costs more per ton delivered at the furnace than it did a few years ago. The demand for open hearth steel is daily increasing and that costs more than Bessemer steel. Labor costs are also higher. Lavor saving devices are being added and as labor becomes dearer and scarcer the need for them is more apparent every day.

The size of blast furnaces seems to have reached its maximum. Other causes might be mentioned to show why it costs more to-day to make iron than it did some years ago, but I simply state these to show that while small savings may yet be made in the matters of organization, labor saving devices, &c., there does not seem to be any immediate hope of a very great saving in the furnace and steel departments themselves.

The point where the saving can be made is in the coke, and this is just beginning to be recognized in America now. In Europe, where their raw materials began to get scarce years ago, they have recognized it for some time, necessity driving them to taking advantage of every economy that was possible, particularly in the saving of by-products. We find this in all departments—brick, cement, slag, wool, &c., from blast furnace slag; fertilizer from basic steel slag; ammonia, tar and benzol from coke oven gas, while the gas is used for firing boilers or in gas engines, and the tar, particularly in Germany, is turned into numerous other by-products.

The Questions of First Cost and of By-Product Markets

A few years ago the chief reasons given for building beehive ovens instead of by-product ovens were the lack of a market for the by-products and the fact that the beehive ovens were lower in first cost. An actual comparison of the cost of a beehive oven and by-product oven, taking into consideration the large difference in yield of coke in favor of the by-product oven and the larger output of coke per day, shows that the difference in cost of plant per ton of output is not so great after all. Add to this the value of the ammonia and tar and the value of the surplus gas as fuel around a steel plant, the scale swings very far in favor of the by-product oven.

The market for by-products is at the worst good enough to make it pay well to recover them in connection with the manufacture of coke, and it is growing every year. The demand for sulphate of ammonia is increasing and is bound to increase each year as the population of the country grows. The average yield of crops per acre in the United States has been decreasing, and as a result we have seen many in the past few years packing up and going over to the Canadian West, where the virgin soil promises larger returns. But every one cannot do this, and yet the land must be made to produce. Sulphate of ammonia is what is going to do it and is doing it. The agricultural scientists have proved that, and are doing the advertising for us. At present the production of sulphate in the United States is not sufficient for the demand and thousands of tons are imported annually, besides all the nitrate of soda and other fertilizers.

The market for tar is also growing. Needless to say anything about the depletion of the forests and the necessity for caring for what timber we get and making it last as long as possible. The demand for creosote oil, one of the chief products from the tar, is increasing, and I believe it will not be long before all railroad ties, pit timbers, bridge timbers, &c., will be creosoted. The naphtha, benzol and finer oils find a ready market now, and as the use of internal combustion engines becomes greater so the value of some of the tar products will be greater.

The pitch market has fluctuated greatly, but even at its lowest price it cannot be proved that by-product ovens do not pay. Pitch is coming into greater use for road paving, and I believe that the next few years will see a considerable development of the briquetting industry, which will create a further market for it.

Recent tests made by the United States Government have shown that for fuel purposes it pays to burn briquettes rather than loose coal. In France, Belgium and Germany I found that practically all the railroad locomotives are fired with briquettes.

American and European Practice

I have just recently had the opportunity of visiting the principal iron and coal centers of England and Europe, mainly with the object of looking into the various types of ovens and by-product recovery systems and briquetting plants. Last year I visited most of the oven plants in the United States.

It is very hard to draw comparisons between the general practice in this country and that of England and Europe, for there is such a great difference in the conditions under which they are working. In general, labor saving machinery has not been adopted to such a large extent on the other side as in America. The reasons given for this are that labor is cheaper and the extra fixed charges and cost of maintenance involved in the machinery just about equal the extra labor necessary to do the same work. Then when business is slack the men can be laid off, but with the machinery the charges go on just the same.

Although there are some very excellent types of ovens in operation in England and on the Continent, Europeans do not run them to such high efficiency, so far as the production of coke is concerned, as is done at some of the plants on this side. Twenty-four hours is about the limit for the coking time, though there are ovens that could do better if it was desired to force them. In both coke ovens and blast furnace practice the idea seems to be that it is more economical not to force matters, as is the general practice on this side. Foreign engineers claim that they get longer life in their ovens and furnaces and also have less trouble in operating.

If we in America were suddenly confronted with some of the problems with which many of the plants on the other side are daily contending, it would mean a sad upsetting of business until we got ourselves adjusted to the new conditions. But they came to them gradually, and one cannot help but admire the way in

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which they adapted themselves to the changed conditions, overcoming difficulties which at first would seem almost insurmountable. In many places in England, Belgium and Germany the best coking coals have become exhausted and in nearly every case it is necessary to wash the coal. In most cases, except at some few places in Wales and England, and at some of the plants in Westphalia, it is necessary to stamp the coal before charging it in order to get a coke at all fit for metallurgical use. Added to this, many of the furnaces are working ores running as low as 25 per cent. iron, and have to calcine them before charging into the furnace, the product from the calcining plant running from 30 to 35 per cent. iron. Other furnace plants are working almost entirely on imported ores. There are, of course, a few plants, more favorably situated than others, that still have good ore supplies.

The most striking difference between America and the older countries is in the saving of by-products, and in this we are far behind. Germany particularly has a long lead, both in the quantity of by-products recovered and also in the simplicity of the apparatus used. I do not say that this is due to their superior inventive genius, but the two chief reasons for it are these: First, the necessity for saving everything possible in order to make finished material at a price which would allow them to compete for the world's trade; second, the fact that the laws will not permit them to pollute the air and streams with gases and sewage as we do in this country, and since they had to dispose of them by other means they made the work pay for itself by the recovery of further by-products.

One of the chief reasons why Germany has such a lead over all other countries is due, I think, to their system of education and the facilities that are given to any young chemist of promise for research work. The chemist knows that if he discovers a new by-product that can be made a commercial success, or if he can discover a method for synthetically manufacturing some product more cheaply than the natural product can be obtained, his future is assured.

There are many things on the other side which I believe if adopted in the United States and Canada would mean a great saving; and there are also things on this side which could well be adopted in Europe. But the difficulties which European engineers have met and overcome will just as surely one day confront us, and with the knowledge of their failures and successes the solution of these problems should be much easier for us.

The Trade Outlook in Canada

TORONTO, August 13, 1910.—The trade prospects of this country for the next twelvemonth are much brighter than they appear to interested observers who are looking on from a distance, and are likely to pay undue attention to the reports of crop shortage in the West. It is now clear that the seriousness of the shortage was much exaggerated in these reports, and that even the facts therein were overemphasized. Dr. Saunders, Director of the Dominion Government Experimental Farms, completed a tour of the western fields just before the beginning of harvest, and estimates that they will yield 100,000,000 bushels of wheat. Very great changes for the better took place in certain areas of the crop in the latest stage of growth, and much improved the outlook that led some statisticians to put the yield down as low as 75,000,000 bushels. But even if the wheat crop had not exceeded this low estimate, there would have been no ground for taking a pessimistic view of trade. The West has other agricultural products than wheat, and it has reason to look for fair returns from these. Its oats crop will run into a large value. Its flax is alone a very important item in this year's production. Its dairy industry goes on expanding, and its live stock interests are likely to do very well this year. It would not be surprising if the total agricultural production of the West this year were to prove nearly equal in buying power to that of last year, when wheat loomed so much larger in the output.

It seems quite safe to say that the agricultural production of all Canada will this year equal in value the total agricultural production of all Canada in 1909. It seems necessary to remind outsiders that it is not only in the West that Canada has grain fields, pasture lands and other food yielding tracts. Ontario still holds the primacy in agriculture. The farm wealth produced by the three prairie provinces—Manitoba, Saskatchewan and Alberta—will not exceed, if it equals, the farm wealth produced in this oldest, most populous and richest of the provinces. From its meadows alone Ontario takes an annual return of scores of millions of dollars, computing the value of the hay sold and that fed to live stock, and the produce of the pasture in the farms of milk, butter, cheese and meat. The pasture has been exceptionally good from early spring up to the present, and the dairy output is expected to be one of the largest the province ever had. Then, too, the grain yield of Ontario is exceptionally large. The wheat crop may total 22,000,000 bushels. It is expected that the proceeds of the fruit crop will be unusually large, for besides a large yield there is now a good system of distribution, giving the Ontario fruit access to the Western market.

In Quebec and the Maritime Provinces conditions are likewise very favorable for the tillers of the soil.

A factor that becomes more important every year is the mineral output. British Columbia, Ontario and Nova Scotia are the provinces in which this is of greatest magnitude. According to the preliminary report of the Mines Branch of the Dominion Department of Mines, the value of the metallic, nonmetallic, structural materials and clay products obtained from the deposits of Canada in the calendar year 1909 was $90,415,763, as compared with $85,927,802 in 1908. Ten years ago the value was $49,234,005. No matter how harvests fluctuate, the mines are likely to go on increasing in productiveness.

If there were likely to be any falling off in the country's buying power in the next twelvemonth the banks would have made adjustments accordingly. In former years of crop shortage they had begun to contract their accommodation before this season. This year they show no lack of confidence. They dispense credit now on much the same scale as they did a year ago. The banks can be trusted to gauge the situation with approximate accuracy, for there is no other business intelligence service in the country to be compared with that of the chartered banks. Through their 2000 odd branches scattered over the productive area of the Dominion they keep informed as to conditions in all departments, the local managers being keen observers and collectors of facts bearing on economic conditions in their territory. There seems every reason to believe that Canada's market will be as roomy as it was in the last year.

C. A. C. J.

Panama Scrap to Go to the Pacific Coast.—It is stated that 500 tons of miscellaneous scrap iron and steel, mostly old French material, will be sent from Panama to San Francisco or Seattle for sale in order that a comparison may be made between the prices obtainable at Atlantic and Pacific Coast ports. All the scrap shipped up to this time has been sent to New York in the Panama Railroad steamships. The trial shipment to the Pacific Coast will be made on the Wotan, a German steamer chartered by W. R. Grace & Co., and although the distance to San Francisco is much greater than to New York the rate per ton for carrying the material will be the same.

Texas Ore Fields to Have Railroad Outlets

AUSTIN, TEXAS, August 12, 1910.—Engineers are now at work running lines for the new railroad that is to be constructed from Longview to the iron ore fields in Cass County, Texas, a distance of about 40 miles. This proposed road will be built by Lewis P. Featherstone of Galveston and associates. It is understood that it will be taken over by the Santa Fe upon its completion and operated as a part of that system. It will connect with the Santa Fe at Longview. Mr. Featherstone and associates are also having a survey made for a line of railroad which they will construct to connect the iron ore fields with the Missouri, Kansas & Texas. This latter line will be about 20 miles long.

It is announced that, as soon as the ore beds are given a railroad outlet, mining operations will be started on an extensive scale and the ore shipped to blast furnaces in Pennsylvania via Port Bolivar, Texas, the Santa Fe's deep water terminus, opposite Galveston. The work of exploring the iron ore field in Cass County has been going on for several months, and an enormous tonnage of ore is said to have been developed. Charles M. Schwab and associates, who acquired the ore beds several months ago, will shortly put a large force of men to work getting out the ore. It is asserted that they plan to establish blast furnaces at Port Bolivar, where the ore will be converted into pig iron and then shipped in that form to the steel works in Pennsylvania. H.

The Youngstown Sheet & Tube Company's Bonus.—On August 5 and 6 the Youngstown Sheet & Tube Company, Youngstown, Ohio, began paying the 5 per cent. bonus earned by its employees under the profit sharing plan adopted about a year ago. The extra pay amounted to about $200,000 and was based upon the earnings of the company for the past fiscal year, ending June 30. All the employees of the company participated in this profit sharing plan except union labor and the officials of the company. The union labor at this plant is confined to the puddle and muck bar departments. At the recent annual meeting of the stockholders of the company, it was voted to continue the profit sharing plan for another year. During the first year employees engaged in construction work participated in the bonus payment, but it has been decided that during the second year only those engaged in actual production, except as noted above, will be entitled to a bonus.

International railroad traffic between the United States and Canada promises to be subjected to joint regulation by the two countries. A conference was held last week on this subject between Chairman Martin A. Knapp of the Interstate Commerce Commission and Chief Commissioner Mabee of the Railway Commission of Canada. It is understood that these representatives of the railroad commissions of the two countries have found common ground and will go into a second conference in the early fall with every prospect of making rapid progress. Both of them are requested to investigate the situation for their governments and to make a recommendation for legislation or a treaty. Chairman Knapp states that the growth of through freight and passenger traffic has been exceedingly rapid in the last five years, making joint regulation almost imperative.

The Iron & Steel Products Company.—A committee consisting of Elverton R. Chapman, 80 Broadway, New York; Gustave Benjamin, and Jacob M. Shenk, has submitted a plan of reorganization to the creditors. All the plants of the company are now closed. The following sales were made by Adrian H. Muller & Son, New York, on August 10; Iron & Steel Products Company, $73,000 guaranteed 6 per cent. mortgage gold notes for $200 and $350,000 of the same company's first mortgage 5s for $960; $15,000 notes of West End Iron Company for $150; $10,000 notes of Lebanon Chain Works for $100, and $30,000 notes of Canton Iron & Steel Company for $1160, in each case for the lot.

Marchant's Unbreakable Rivet Sets

Since the invention of the pneumatic hammer, the users of such tools have experienced much trouble, expense and annoyance from the crystallization and consequent breakage of the rivet sets. This breakage invariably occurs in the neck of the tool, and it is not unusual in driving large rivets for a riveting gang to break two or three sets a day. Since the introduction of the use of alloys, however, steel makers have made great strides in the manufacture of steel that would resist the tendency to crystallize under the repeated blows of the hammer, but it has been difficult to make these alloy steels with any degree of uniformity. One lot of steel would give excellent results, but another might fail.

During the past year Geo. F. Marchant, manufacturer of rivet sets, Elizabeth and Lake streets, Chicago, has succeeded in obtaining a vanadium alloy steel that is not only uniform in quality, but has shown remarkable results when made into rivet sets and properly heat treated. To cite an instance of the durability of the vanadium sets, two of them were put to work in February by the Strobel Steel Construction Company on the new Northwestern Station, Chicago. They have been in constant use since that time, and it is estimated have driven more than 25,000 7/8-in. rivets, and are apparently in as good condition now as when new. It is claimed that rivet sets made from high grade carbon tool steel would seldom last, especially during the cold weather, more than two or three days, and would often break during the first hour of use.

Chief Engineer James A. Aupperle of the Metallurgical Research Department of the American Rolling Mill Company, Middletown, Ohio, read an interesting paper on the properties of American ingot iron August 10 at the convention of the National Association of Sheet Metal Workers, Philadelphia. The address has been printed in pamphlet form for distribution. American ingot iron is the special product of this company, and has been shown by severe tests to resist corrosion effectively. It is largely used in the manufacture of sheets.

The American Sandless Casting Company, Philadelphia, Pa., has been incorporated with a capital stock of $5,000,000. Frank M. Riter and W. Northrope Cowles of that city and S. D. Townsend, Jr., Wilmington, Del., are the incorporators. The company has been formed for the purpose of acquiring the patent rights that have been or may be obtained by Edgar A. Custer, now with the Tacony Iron Company, Philadelphia, for casting iron in permanent metal molds. Those interested state that the plans of the new concern have not been fully decided upon.

The Youngstown Furnace Company, which was recently incorporated at Youngstown, Ohio, has taken over the business of the Youngstown Furnace & Supply Company, with office at 13 East Commerce street. A. K. Kimmel is president and general manager, C. F. Landolt is vice-president and H. E. Owen is secretary and treasurer. The company will continue to manufacture Lyon, Apex and Bessemer warm air house heating furnaces, which have been on the market for a considerable length of time.

Titanium in Steel and Iron Castings

A Review of Tests Made at a German Foundry

A very elaborate paper on the action of titanium when added to iron and steel castings appears in *Stahl und Eisen* of July 13. It is the result of a long series of observations made by Leonhard Treuheit, a foundry superintendent at Elberfeld, Germany. The conclusions derived are at variance with those of other investigators, and hence a somewhat critical review would seem in order considering the large amount of space given the matter in the important journal in question.

Mr. Treuheit made his tests with 25 per cent. titanium thermit and with 10 to 15 per cent. ferrotitanium. He was desirous of noting whether the temperature of the bath in either steel or gray iron work was raised any as the result of the titanium addition, and further whether the physical condition of the castings was enhanced. In the first series of tests about 1500 lb. of molten gray iron was tapped from the cupola into a previously heated ladle, the temperature of the metal in the spout being 2475 degrees F. After tapping this became 2340 degrees in the ladle. The temperatures were measured with the Wanner pyrometer. About 440 lb. of metal was poured into a smaller ladle and from there cast into test bars. The temperature in the smaller ladle was now 2240 degrees F., a drop of 235 degrees. The balance in the big ladle received a can of 1.43-lb. titanium thermit (25 per cent. titanium, which figures out 0.0324 per cent. titanium actually added). Mr. Treuheit reports that the ebullition was very slight, lasting only 1½ min. During this reaction temperatures were 2250 degrees F. before the reaction and 2215 degrees after. Repouring into a smaller ladle for test bar purposes brought the temperature down to 2160 degrees.

Evidently Mr. Treuheit was not quite satisfied with this test, and made another in which the drop in temperatures was not quite so marked; indeed, the end temperature given above is so near the melting point of that class of cast iron that if correct it is a wonder that the molds could be poured. This second test also involved the use of 0.04 per cent. titanium, or slightly more than the first.

A Question as to Temperature Records

Criticism of the results given so far would lie in the direction of evident inaccuracy of the temperature readings either on the part of the operator, or more likely in the instrument. A difference of 235 degrees in pouring to the final ladle, even if this is cold, is so far off that results based thereon are at least questionable. Further, the addition of only between 0.03 and 0.04 per cent. of titanium to molten metal is so small a quantity that it could hardly affect results. At least 0.1 per cent. is the proper dose. Hence the elaborate tables given would prove little. These figures may be summarized as follows: Of a dozen tensile tests, the average before using was 28,870 lb. per sq. in., and afterward it dropped down to 28,160 lb., indicating that instead of purifying the bath the titanium thermit did the other thing, probably due to the method of handling, as the temperature was reduced at the same time. Transverse tests with bars 1.2 in. square on supports 30 in. apart gave a breaking load of 980 lb. with 0.35 in. deflection before treatment, and 1200 lb. with 0.36 in. deflection after treating, each figure being the average of a dozen tests. Here again we note the variation from the modern testing conditions, which for Germany require a round bar of 1¼ in. diameter, and supports much closer than 30 in. apart. The results of the repeat test give higher values in favor of the titanium, of which more was used, the tensile strength increasing to the extent of 4.6 per cent. For the transverse tests, however, round bars were weaker, but square bars were stronger.

The iron used ran 1.77 per cent. silicon, 0.57 manganese, 0.490 phosphorus, and sulphur close to 0.090, Mr. Treuheit accounting for a reduction in sulphur of "0.0046 per cent." by reason of the titanium addition. Titanium could not be traced in the metal chemically.

The third series of tests was made by remelting the remains of the treated material of the second test in the crucible and hence will not interest us specially. Some excellent fracture photographs accompany the paper, but, as indicated, these show nothing special as the result of the titanium thermit addition, which seems perfectly natural in the light of the data given.

Unsatisfactory Results with Steel Castings

Mr. Treuheit then conducted a similar set of tests with steel. Here the initial temperature as the metal came from the furnace was 2950 degrees F.; in the ladle it dropped to 2725 degrees, and when repoured for making test pieces ran 2650 degrees, a drop of 300 degrees from the initial. Plates were cast from which the several test pieces were cut out. Mild steel without titanium had an elastic limit of 36,550 lb. per square inch, an ultimate of 55,900 lb., elongation of 33.5 per cent., and reduction of area of 58.7 per cent. After addition of the small amount of 0.04 per cent. titanium it showed 35,130 lb. per square inch elastic limit, with an ultimate of 55,330 lb., an elongation of 32.4 per cent., and a reduction of area of 60.9 per cent. These figures again indicate something wrong with the method of conducting the test, as well as the making of deductions from insufficient titanium additions. The steel in question was quite soft, running 0.09 in carbon.

A further series of tests was made with a steel running 66,280 lb. per square inch, and here also the strengths dropped, while the elongation and reduction in area went up a little.

Larger Additions to Gray Iron and Steel

The next set of tests was made with ferrotitanium additions to gray iron. The alloy contained 14.52 per cent. titanium and 0.458 per cent. manganese. In the tests 0.09 per cent. titanium was added, which should be about the right amount. Titanium up to 15 per cent., however, is pretty hard to melt in cast iron, even if pre-heated to redness, and hence may not have fully dissolved before pouring. The temperatures before and after tapping into the ladle and adding the titanium alloy were close to 2400 degrees F. The composition of the cast iron was about 1.30 silicon, 0.60 manganese, 0.70 phosphorus and 0.09 sulphur. Almost 0.02 sulphur was taken out by the addition. The tensile strength before adding was 28,580 lb. per square inch, and 22,470 lb. after, showing a serious loss. On the transverse tests we have breaking weights of 1120 lb. and 1070 lb. before and after, with deflections of 0.27 in. and 0.24 in., respectively.

The next series of tests was with the same ferrotitanium added to steel. About 0.14 per cent. titanium was added to some 200 lb. of 18 carbon steel, and this poured into plates from which the samples were cut. The results show very little improvement in any direction except in reduction of area, which is more pronounced. The final series of tests with 28 carbon steel under the same conditions showed a small reduction in everything except the elastic limit, this going up a very little.

After reading the 12 pages of this paper in *Stahl und Eisen*, one is a little at sea as to where the sore spot of the problem lies. The results are so much at variance with the facts as gathered by other experimenters that apart from the evident use of too little titanium in nearly all the series and probable ineffectiveness of portions of it where enough was added, owing to the refractory nature of high titanium alloys, there can only remain the suspicion that the experi-

menters in question were not fully familiar with the conducting of scientific tests. There are some earmarks of this, for in giving temperatures these are as close as one degree, an impossible matter in these high ranges. In the analyses the third decimal place is quoted, and so on.

Only one other thing might have been the case, though this would have been one chance in a million, and that is that with the very highest purity in the materials used, titanium has no effect, as it is, after all, only a purifier of oxidized metal, as well as a scavenger for gases. This supposition can be dismissed as remote. Manufacturers of steel as well as foundrymen will be interested in seeing what further developments may take place in regard to the use of titanium in Germany, as it is the home of titanium thermit and also a large consumer of ferrotitanium made in this country.

R. M.

The Bollinger-Andrews Construction Company, Pittsburgh, with plant at Verona, Pa., has contracted with the Nagle Engine & Boiler Works, Erie, Pa., for four 72-in. by 18-ft. boilers, to be installed in its power house. The first named company is also erecting an extension to the green sand department of its foundry, approximately 150 x 160 ft. It is busy in the structural department, turning out steel structures and mill buildings for various concerns, and is also operating its ingot mold and gray iron foundries to good capacity.

An exposition of the industries of New England, promising to be the most elaborate of any of its kind, will be held in Mechanics' Building, Boston, during the four weeks of October, 1911. The project is in the hands of prominent members of the Boston Chamber of Commerce and has received the indorsement of the Boston Merchants' Association. Chester I. Campbell, who has had much experience in this field of activity, is manager of the exposition, aided by an Executive Committee of prominent business men.

The Youngstown Iron & Steel Roofing Company, Youngstown, Ohio, resumed operations in its hot mill department Monday of last week. This department was closed for about four weeks for the purpose of making necessary repairs. The company's three new sheet mills and two special mills under construction are expected to be ready for operation in about five weeks, when the force of workmen will be considerably increased to take care of the greater production.

The Sauer Power Generating Company, 5115-5119 Rosetta street, E. E., Pittsburgh, Pa., has completed an addition to its plant, about 25 x 30 ft., in which it has installed a boiler and other power machinery. The company, which was recently incorporated, will manufacture a line of patented specialties, including the Sauer adjustable shaft bearing, small turbines for a variety of purposes, gas burners, &c. It will require a medium-sized milling machine for its machine shop.

The Independent Bridge Company, Pittsburgh, Pa., has received a contract from the Government for the construction of rolling gates for the locks at dams Nos. 8 and 11, Ohio River, which will take about 600 tons of fabricated steel. The company has also secured the contract for the steel required for an extension to the Harbison-Walker Refractories Company's plant at East Chicago, Ill.

Two British manufacturing concerns have apparently decided to locate branch factories in Montreal. The George Anderson Company, which makes cranes and stove machinery, is to build a large factory there in time to have it in operation by next May. The Cleveland Bridge & Engineering Company, Darlington, England, is the oether company. That concern has tendered for the construction of the Quebec Bridge.

The British Foundrymen's Association

The seventh annual convention of the British Foundrymen's Association was held at Manchester, England, August 2 to 4 and brought out the largest attendance in the history of the association. The annual report showed a membership of 571, as compared with 448 a year previous. Percy Longmuir, well known in the United States for his contributions to the literature of cast iron, was elected president for the coming year. In an address he said that the selling price of castings in recent years had not been as high in proportion to that of pig iron as in earlier periods. This condition and the fact that specifications for special castings are being successfully met indicate, in the speaker's opinion, that the standard of practice in British foundries is advancing. The list of papers read at the meeting included the following: "The Cupola," by R. Mason; "Cupola Slags," by T. Swinden; "Properties of Coke," by F. K. Knowles; "Hardness Testing of Cast Iron," by R. Mather; "Malleable Cast Iron and How It Is Produced in Sweden," by G. A. Blume; "Theory Underlying Malleableizing," by W. H. Hatfield; "The Electric Furnace," by W. S. Gifford; "Brass Alloys," by O. F. Hudson.

Concerning the monumental volumes on "The Iron Ore Resources of the World," to which reference was made at length in *The Iron Age* of August 11, it should be said that three languages are represented in the text —English, German and French—but no portion is in more than one language. The chapters devoted to Germany, Luxemburg, Switzerland, Austria-Hungary, Russia and Norway are in German; those describing the ores of France, Italy and Spain are in French, while practically all the remainder, and the larger part of the work, is in English.

German shipbuilders are encountering serious labor troubles. On August 6 a strike occurred at Hamburg in consequence of the employers refusing a demand for higher wages and shorter hours. It was then decided by the shipbuilders of the empire that they would lock out 60 per cent. of their workmen in consequence of this strike. On August 11 shipyards at Kiel, Stettin, Bremen, Lubeck, Danzig and Flensburg were involved. It is expected that 50,000 men will shortly be idle.

The statistics of bank clearings in the country's trade centers for the week ending August 13, partly estimated, show a total of $2,581,879,470, a decline from the preceding week of 7 per cent. and from the corresponding week of 1909 of 16 per cent. The total last week is smaller than for any other week of 1910. In comparison with the corresponding week of 1909 the shrinkage at New York City was 24 per cent., at Boston 12 per cent. and at Chicago 6½ per cent.

The Harlan & Hollingsworth Corporation, Wilmington, Del., has received an order for 30 vestibule passenger coaches, five vestibule combination cars and five baggage cars from the Philadelphia & Reading Railway Company. All will have steel underframes and wood bodies.

Bradley Stoughton, consulting engineer, announces that as the work at his New York office, 165 Broadway, and his Philadelphia office, 1007 Betz Building, has made larger demands upon his time, his Pittsburgh office will no longer be maintained.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET.

Scope of Antitrust Law.—The Sherman antitrust law is not violated by the seller of a manufacturing plant who sells its products and the products of other plants in sections of two or three States, agreeing not to engage in the same kind of business in that territory for a specified period. That law is inapplicable to a legitimate business transaction, where the restraint of trade complained of is merely incidental or collateral, and is also inapplicable to contracts having a remote and indirect bearing upon interstate commerce. (Pennsylvania Supreme Court, Harbison-Walker Refractories Company *vs.* Stanton, 75 Atlantic Reporter 988.)

Remedy of Buyer on Seller's Breach of Contract.—If a seller of goods refuses to deliver them, the buyer is entitled to buy similar articles on the market and recover from the seller the difference between the price paid and the contract price. If the buyer has other articles of the same kind on hand, bought at a lower price, he has the right to substitute them for those contracted for delivery and charge the seller with the difference between their cost and the contract price. (Pennsylvania Supreme Court, E. P. Burton & Co. *vs.* Miller, 75 Atlantic Reporter 1035.)

Validity of Agreement Not to Engage in Business.—A contract not to engage in a competitive business, although a contract in restraint of trade, is not opposed to public policy, but is valid and enforceable, when the restraint contracted for is partial, and is reasonably required for the protection of the opposite party in the use and enjoyment of the particular business contracted not to be carried on. A contract founded upon adequate consideration, not to engage in the manufacture or sale of white porcelain doorknobs, unlimited as to space, but limited as to time to a period of approximately five years, is reasonable, and will be inforced by injunction. (New Jersey Court of Chancery, Artistic Porcelain Company *vs.* Boch, 74 Atlantic Reporter 680.)

Rights Under Sale Contracts.—Under a contract of sale providing that if "after a thorough trial" the articles sold are not found to work "satisfactorily" the buyer may rescind the order, the test of the buyer's right to rescind is whether the article should be satisfactory to a reasonable man. (Massachusetts Supreme Judicial Court, Fechteler *vs.* Whittemore, 91 Northwestern Reporter 155.)

Rescission of Conditional Sales.—Where one sells articles on condition that title is to remain in him until payment of the purchase price, no express rescission of the agreement is essential to entitle him to retake the property on the buyer's default. In such case the seller may resell the property either before or after resuming possession. (Massachusetts Supreme Judicial Court, Hoe *vs.* Rex Mfg. Company, 91 Northeastern Reporter 154.)

Right to Materialman's Lien.—Mere delivery of material to a contractor at his place of business is not a "furnishing" of material for an improvement, within the meaning of the Wisconsin statute, which gives a subcontractor a lien for materials so furnished, where the material is never incorporated in the improvement nor delivered into the possession or control of the owner. (Wisconsin Supreme Court, Francis & Nygren Foundry Company *vs.* King Knob Coal Company, 126 Northwestern Reporter 39.)

The Bureau of Manufactures, Department of Commerce and Labor, is preparing a pamphlet on packing for export, being largely the result of inquiries made by American consuls. Illustrations of good packing will be given and some examples will be shown pictorially of the results of careless or insufficient packing. The practice of leading exporters in all countries will be drawn upon for examples of the most effective packing.

The July figures of our foreign trade show larger totals of both imports and exports than in July of any earlier year except 1907, in which year both imports and exports exceeded those of the present year. The total imports of July, 1910, were valued at $117,312,105. The exports were $114,493,222. The excess of imports was $2,818,883 against an excess of imports of $3,151,402 in July, 1909.

The Cincinnati pig iron market report of Matthew Addy & Co., for the week ending August 13, says: "As a matetr of historical fact, Southern pig iron prices to-day are lower than they have been, with one brief exception, since the dull period of 1903-4, and before that time of depression to-day's low prices were never paralleled, except in 1898."

The Goshen Iron Company, whose main office is at Wilmington, Del., has purchased Victoria Furnace, at Goshen, Va., which it has been operating under lease since January 2, 1907, from the Chapman Iron, Coal & Coke Company. The property thus acquired includes Virginia iron ore and coal lands and some West Virginia coal properties. The company has been operating 60 coke ovens at Elverton, W. Va. The president of the Goshen Iron Company is A. J. Moxham; vice-president, P. P. Huston, Jr.; secretary, Isaac Fogg; treasurer, F. E. Fenton; manager, O. M. Stull, at Goshen.

The Superior Mfg. Company, N. S., Pittsburgh, Pa., manufacturer of gas stoves, furnaces, gas logs, &c., recently completed the addition of a 40 x 80 ft., four-story brick and steel building, set on concrete piers. A 50-hp. Du Bois gas engine, direct connected to a generator, and other machinery, are being installed. This enlargement greatly increases the company's manufacturing and warehouse facilities, and will enable it to handle its growing business to better advantage.

The National Enameling & Stamping Company's results for the fiscal year ending June 30, 1910, have been published in the daily papers, comparing as follows with the previous year:

Fiscal year.	Gross profits.	Net profits.	Interest on bonds.	7% on pref. stock.	Balance. surplus.
1909-10.....	$1,695,168	$1,062,345	$200,451	$598,262	$263,632
1908-09.....	1,359,191	807,407	39,583	598,262	169,562

Casualties from the great floods, which last week inundated many districts in Japan and on Friday and Saturday submerged two of the principal wards of Tokio almost entirely, were given out August 15, after official investigation, as 1112 dead and missing. Thousands of persons are homeless and dependent on public relief.

Arrangements for the general meeting of the American Iron and Steel Institute, to be held in New York about the middle of October, have been practically completed, and an announcement of the details of the programme will soon be made. The attendance of representatives of British and Continental iron and steel industries is expected.

A party of 4 professors and 28 students of the University of Cologne, Germany, who are making a tour of industrial plants in the United States, visited the mills of the Indiana Steel Company at Gary, August 13. The party included Count Von Griebel, an official representative of the German Emperor.

The statement of output of the Nova Scotia Steel & Coal Company in July shows 70,000 tons of coal raised and 90,000 tons shipped, 7600 tons of pig iron made, 8690 tons of steel, 2833 tons of ingots bloomed, 3500 tons of steel finished, 1103 tons of axles shipped and 7060 tons of coke made.

The deputy collector of the port of Gary, Ind., reports 331,115 tons of iron ore received at the Gary harbor in the month of July; 80,000 tons more than in June. The total for the season to date is 819,163 tons, an average of 8359 tons a day.

Kitselman Brothers, Inc., Muncie, Ind., have established a power plant of their own to furnish current for their wire fence factory, and for the Indiana Steel & Wire Company's plant, also controlled by them.

The Gary Car Axle Mill

The Indiana Steel Company's Great Axle Plant

The manufacture of steel axles for railroad cars is a comparatively new industry. Until a few years ago the railroads used wrought iron exclusively for the axles of freight and passenger cars, as it was believed that wrought iron axles were more reliable than steel. Acid open hearth steel had been used quite extensively for locomotive axles, but was not adopted for cars on account of its higher cost. The chief danger to be guarded against in car axles is crystallization. A steel rail receives only the occasional stress of a passing train, but a car axle is subjected to the constant pounding stress of the rail joints, and Bessemer steel of the quality that gives good service in rails does not answer the requirements of an axle. A broken axle may cause a wreck with enormous property loss, and human life is also involved. Wrought iron has, therefore, been preferred for axles because it has been considered less liable to crystallize, or to break from other causes.

When open hearth basic steel became available in large quantities, the attention of the railroads was soon attracted to the qualities which made it available for the manufacture of axles, and during the past 10 years steel has been rapidly superseding iron both in freight and passenger car axles. As the axle industry has grown to large proportions and requires a considerable tonnage of basic open hearth steel, it was natural that an axle mill should be one of the first of the great works erected at Gary, Ind., to convert into finished product the output of the greatest steel plant in the world. More than half of the axles required in the United States are used on railroads which center at Gary and Chicago, so that a mill at Gary has an important geographical advantage in supplying the market at the lowest cost for production and delivery. Gary also promises to be the center of the steel car-building industry west of Pittsburgh, and the Gary axle mill will be an important unit in supplying rolling stock to the railroads, a business which has grown to far larger proportions than the manufacture of steel rails.

The Layout of the Axle Plant

The axle mill at Gary occupies one large building, located southwest of the rail and billet mills. The entire plant is under one roof, 220 x 984 ft., affording over 3 acres of floor space. The operations are all conducted in a direct line from east to west, the billets entering at the east end and the finished axles being stored for shipment at the west end of the plant. As in all the operations at Gary, the plant has been designed to utilize machinery and reduce labor cost, thus affording employment to a higher class of men or paying better wages to men who develop the necessary ability.

The billets which supply the axle mill are brought in standard freight cars from the billet mill to the northeast corner of the axle plant. Electric cranes

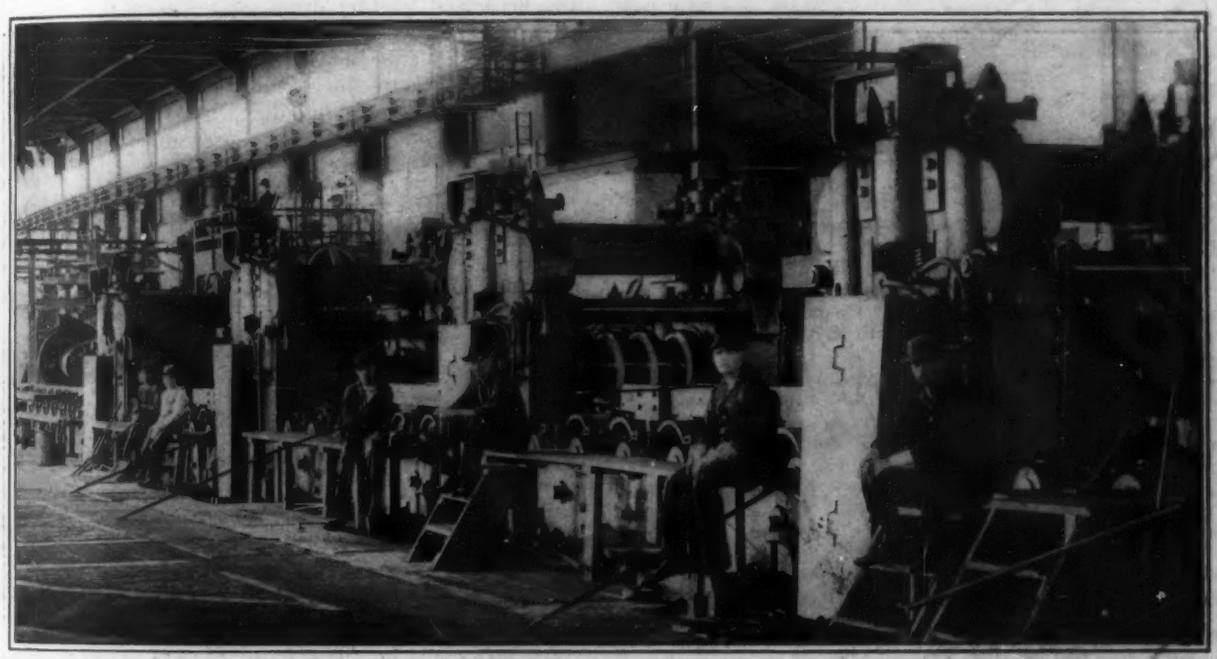

Fig. 1.—View of the Gary Axle Rolling Mill.

with magnets unload the billets from the cars, and place them on the pusher skids on which they enter the heating furnace. There are two 12-ft. furnaces of the standard continuous type, heated with producer gas, the producers being located alongside the furnaces. The hot billets drop from the other side of the furnace on a table or conveyor which carries them to the rolls.

There are four trains of rolls, Fig. 1, driven by one 500-hp. General Electric induction motor, the last train being chilled rolls which finish the largest diameter of the axle. This is an innovation in axle mill practice. Heretofore it has only been considered necessary to roll down the corners of axle billets, leaving all the work of shaping to be done with the steam hammer. In designing the Gary mill, however, it was figured that if four stands of rolls were used, with finishing rolls for the last pass, it would be possible to roll the wheel seats and thus save time and cost in the hammer shop. This plan has worked successfully in practice, and it is seldom found necessary to use a hammer on that portion of the axle which is to form the wheel seat. Another striking feature of the train of rolls is that the rolls are turned with four grooves or passes, so that any one of the four standard sizes of axles can be rolled at the pleasure of the operator in the pulpit who directs the movement of the billet by electrically controlled switches.

The billets contain enough material for one axle of whatever size is being rolled. The runout table carries the finished billet or axle blank from the rolls to a

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54-in. hot saw, Fig. 2, directly opposite the pulpit occupied by the operator who controls the saw. The runout table continues the full length of the hammer shop with the hammers set on each side of it, and a switch on the table opposite each hammer. The furnaces, rolling mill and hammer shop are covered by Alliance electric cranes, which are available for moving machinery or parts and for any emergency that may arise in handling the material.

The axle mill is the only plant at Gary where steam power is used for the regular operation of some machinery. Electric power generated from blast furnace gas is used wherever possible throughout the entire group of industries at Gary. No means has yet been found, however, to replace steam in the operation of large hammers of the capacity required for forging axles.

Six steam hammers are now in operation, Fig. 3, but room is provided in the hammer shop for six more. The hammers were built and installed by the Morgan Engineering Company. The 7500-lb. hammers have a full stroke of 36 in., the actual working stroke being regulated according to the force desired for each blow. The dies used have three steps, one to swage the middle portion of the axle, one to rough the journal and one to finish the journals. In operation the man in the pulpit who controls the saw and the runout table switches a hot axle billet in front of the hammer which is to be served. The workmen who operate the hammer have a heavy pair of tongs suspended from a jib crane. Grasping the hot billet or axle blank at one end with the tongs they swing it around into the hammer, Fig. 4, passing it back and forth and turning it until the forging operation is completed on one end of the axle. They then swing the tongs around with the crane to the other side, and hold the axle by the finished end, continuing the operation until the complete axle is forged. The rough axles are then passed along to the west for the next operation.

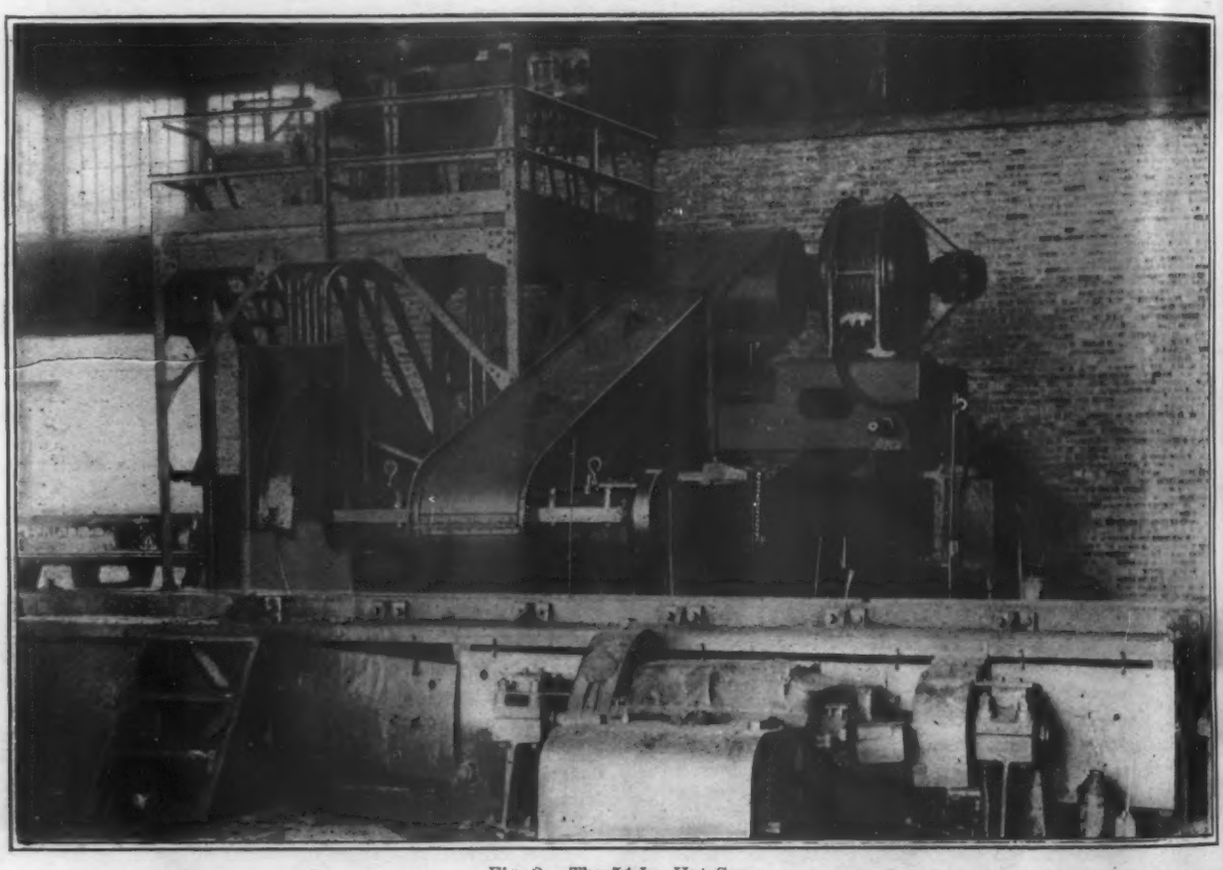


Fig. 2.—The 54-In. Hot Saw.

The Straightening Press

The general practice in axle mills is to straighten the axles under the steam hammer after they have cooled. This operation, however, is a severe one on the hammer and soon wears out the dies, besides being very expensive in time, in labor and the use of the equipment. An ingenious and powerful press is used for this work in the Gary mill. The principle employed is that of a powerful gag press, Fig. 5, which exerts sufficient force to straighten the largest sizes of car axles.

The press is operated by a 15-hp. electric motor, with a heavy flywheel and a train of gears. The plunger, or ram, which moves horizontally against the axle, has a stroke of about ½ in., obtained from an eccentric journal. The operator, by the use of a hand lever, is able to shorten or lengthen the plunger stroke by turning an ingenious eccentric drum, which is set in the ram. The eccentric design of this drum or cylindrical block of steel permits a variation of 1½ in. in the "reach" of the ram. While this drum is one solid steel casting, its form is the same as though it had been sawed in two, and the two halves moved so that their centers were 1½ in. apart; or it may be described as a double wedge, coiled in circular form. The workman who directs the straightening operation is able, by turning this eccentric block, to regulate the stroke within perhaps a hundredth part of an inch, so that the exact force required can be brought against the axle to straighten a bend or kink.

The axle is rolled on the press by hand over a "drawbridge," which the workmen can raise after they have placed an axle in position. The axle rests against a block, and is supported by rollers which enable the workmen to run it back and forth so the pressure can be applied at any point that may be necessary. The press is so efficient in its operation that a single stroke of the ram is usually sufficient to straighten any bend, kink or "hook" that may be encountered, and the straightening effect is obtained without any destructive strain that might impair the strength of the finished axle.

Cutting Off and Finishing

The cutting off machines, Fig. 6, of which there are 15 now installed in the Gary mill, were built by the

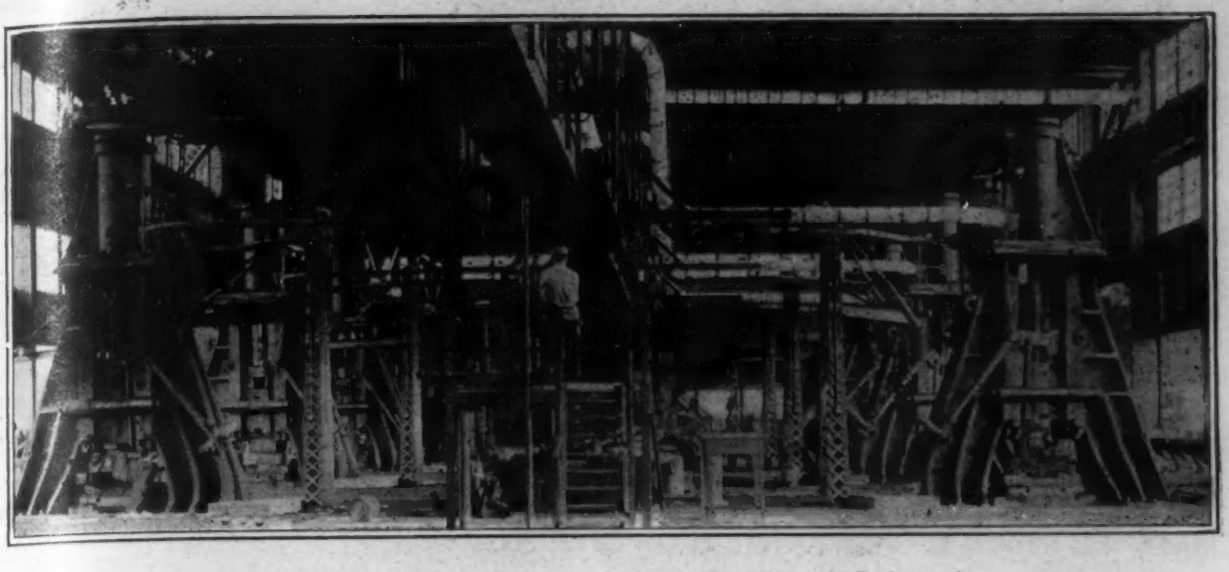


Fig. 3.—View of the Six Hammers, with the Rolling Mill in the Background.

Fawcus Machine Company, Pittsburgh. They are driven by individual motors, with an auxiliary drive and a two-speed geared clutch. From the clutch the power is transmitted by silent chains to a pinion on the countershaft of the machine. The axle is held in two chucks, which leaves the ends free. Each chuck has two powerful jaws, which are drawn together at each end by male and female screws. These screws are about 2 in. in diameter, and are controlled by a train of gears. The center pinion in this train of gears has a bolt head on it, and the workman by turning this pinion with a wrench brings the axle to a center. The cutting off tools are then set at each end, and the axle is left with the exact length desired and a smooth lathe finish on each end. When the ends have been faced off a hole is drilled in each end of the axle as centers for the finishing lathes. The centering tool is driven by a separate motor, and is mounted so that it is swung out of the way while the end is being cut off, and is swung back to a center concentric with the chucks when in operation.

From the cutting off machines the axles are carried

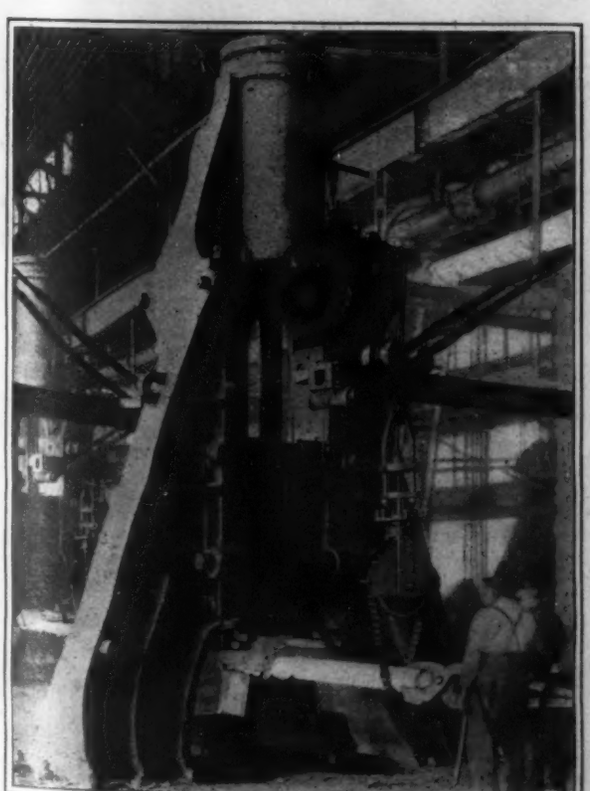


Fig. 4.—One of the Hammers with a Hot Axle in Position.

to the finishing lathes, Fig. 7, of which there are 10 now installed. These are regular axle lathes built by the Niles-Bement-Pond Company. The only notable new feature in their construction is that they have four tool rests, so that the operator is able to keep four tools going at the same time. Some of the railroads are specifying that the body of the axles shall be turned, and the engineers in charge of the axle mill figure that a workman can set two of the tools which will finish the middle of the axle while he is giving his attention to the tools which finish the journals.

An interesting feature of the lathe floor is an installation of jib cranes, Fig. 8, to handle the axles in and out of the lathes. These cranes were designed by the Indiana Steel Company and built by the Whiting Foundry Equipment Company, and one of them is set opposite each lathe. The upright member of these cranes is a round hollow steel post, which revolves in roller and ball bearings in a cast iron pedestal. The jib is composed of two members, forming a track for a small four-wheeled trolley, which moves back and forth under the control of the workman. An individual motor is mounted near the top of each crane, and is geared to a revolving crank of sufficient radius to lift axles through the range required in the work. A loop of cable extends from this revolving crank over pulleys on the trolley, and down to a pulley and hook which carries the axle. A check switch on the motor can be set so that axles are lifted automatically to the right hight for centering in the lathe; the motor being started and stopped by a cord within convenient reach of the workman. The axle is picked up with gag tongs, which catch it at one end and hold it in a horizontal position to facilitate centering in the lathe, the tongs being hooked on the lifting cable which is controlled by the motor. Owing to the peculiar design of this crane, the workman loses very little time in picking up an axle, swinging it around and centering it in the lathe. This increases the efficiency of the lathe by reducing to a very small percentage of the working day the time spent in removing a finished axle and centering another.

Economy in Handling Material

The engineers in designing the axle mill have given very careful attention to the problem of economy in handling and transporting the material. The section occupied by the furnaces and the rolling mill is commanded by a 20-ton electric traveling crane. The hammer shop has two parallel runways of 45½ ft. each for 15-ton cranes. The finishing end of the mill is divided into three bays, 60, 50 x 50 ft. wide, each of which is covered by a 15-ton Alliance crane with spans

Fig. 5.—The Axle Straightening Press.

of 56, 45½ and 45½ ft. A peculiar feature of the hammer shop and finishing shop is that the girders down the middle, on which the cranes travel, are suspended from the roof trusses, so that there are no supporting columns to interfere with handling material, and the entire working space is unobstructed. The racks used for storing the semifinished and finished axles also contribute to the transportation system. These racks are practically railroad tracks, each rack consisting of two parallel steel rails raised from the floor on supports which place them at about the working hight of the machine tools used in the finishing shop. As the axles are laid horizontally on these racks, they are rolled easily and quickly by hand for any short distance, while the cranes overhead are available for carrying the material from one section of the plant to another. Similar racks set opposite each finishing lathe are used for inspection and temporary storage of the finished product.

A system of tunnels is provided for handling the scrap and chips. These tunnels run under the cutting off machines and the lathes, and chip cars are set under each machine to catch the scrap which drops into the cars through chutes in the floor. This keeps the finishing floor clear of scrap, and provides an economical system for handling the waste material. The chip cars are drawn out once a day, and the scrap is unloaded into standard railroad cars or into charging boxes which carry it to the open hearth steel plant. The tunnels also provide room for the return pipes, which carry the soda water back from the cutting off tools and lathes to the supply reservoir.

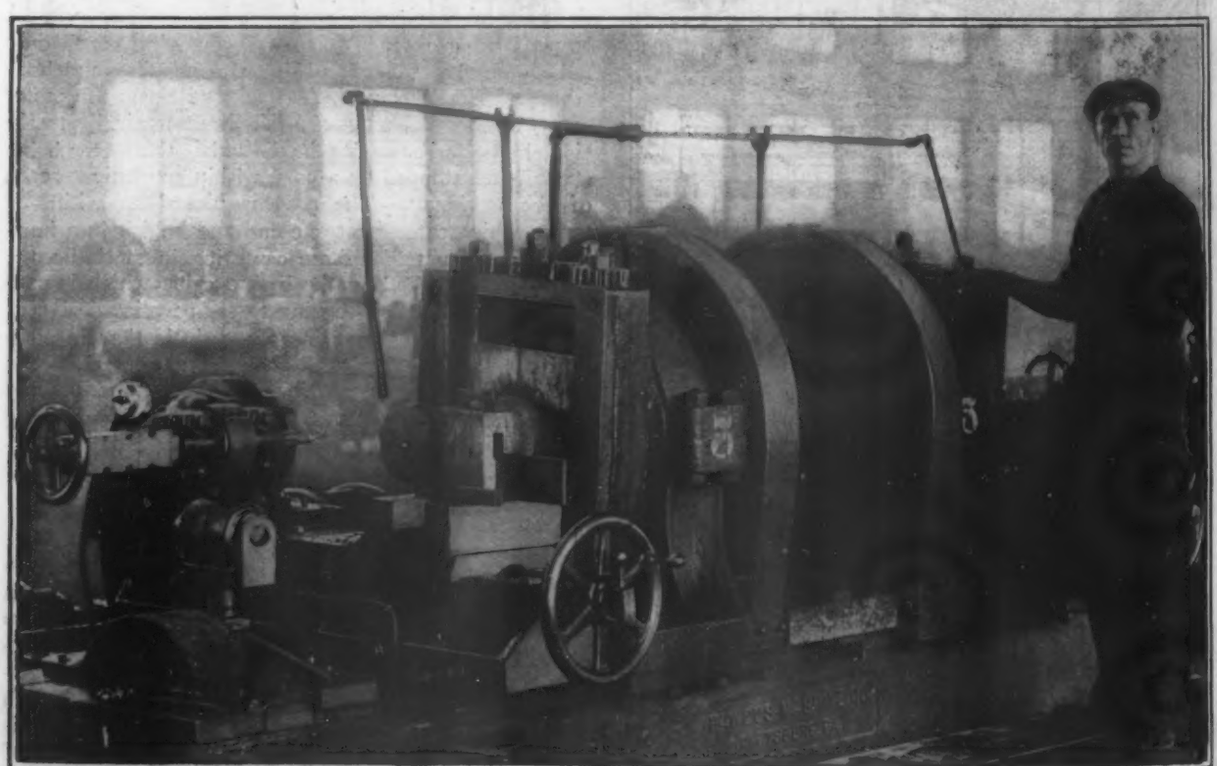


Fig. 6.—One of the Axle Cutting-off Tools.

A system of forced ventilation is provided for the entire plant. The waste steam from the hammers will be used in winter for heating the finishing shop. The heating and ventilating plant is located overhead, supported by the roof trusses. The waste steam from the hammers passes through coils, and fans of large capacity are provided to carry the warm air through conductor pipes which extend the length of the building. Downcomers from these pipes bring a supply of air

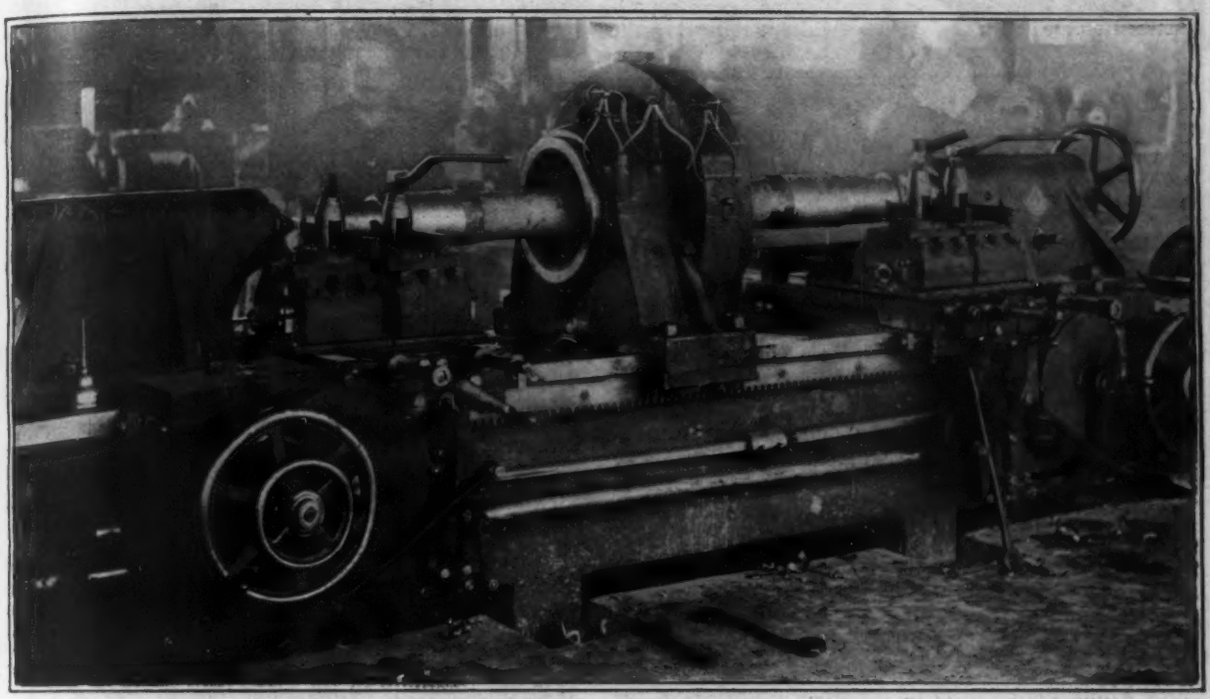


Fig. 7.—One of the Axle Lathes.

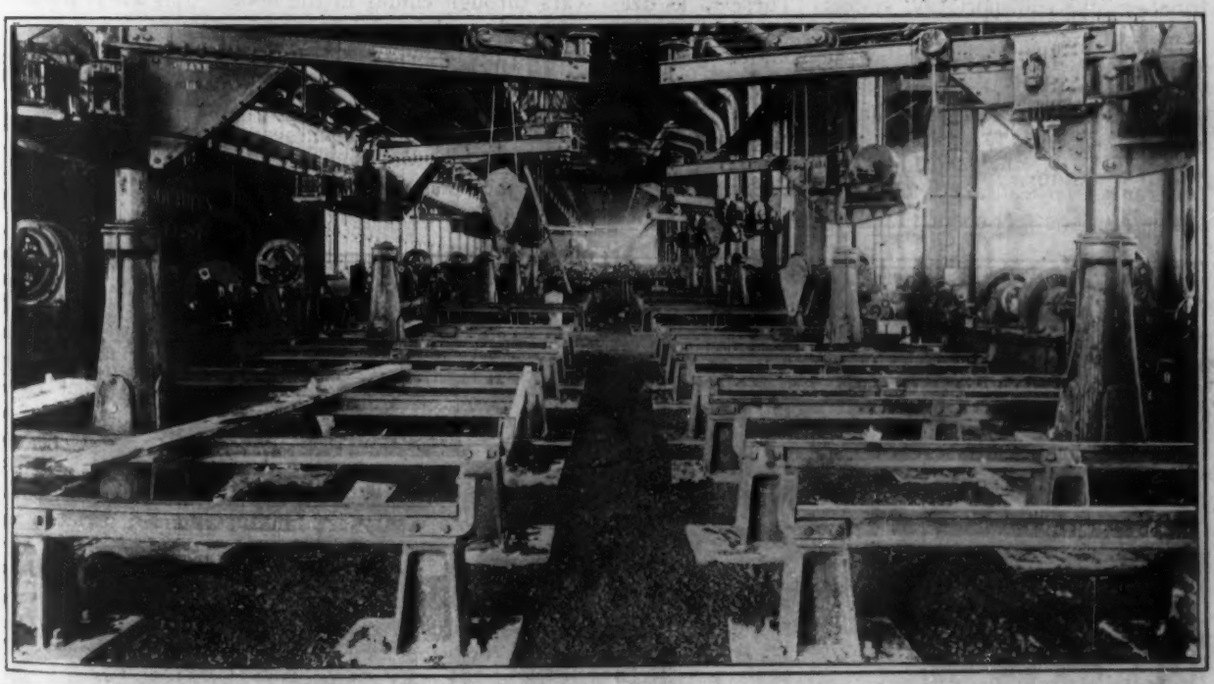


Fig. 8.—View of the Lathe Shop and Cranes.

opposite each group of tools. The plant is unusually well lighted by large side windows as well as skylights.

A Scotch Dredge for Panama.—The Isthmian Canal Commission has been authorized by President Taft to purchase from foreign builders a steel ladder dredge for the Panama Canal. The American manufacturers who bid on the dredge named a price more than double that of the leading foreign competitor. The Union Iron Works, San Francisco, bid $874,146, while William Simons & Co., Renfrew, Scotland, bid $399,340, and Lobnitz & Co., also of Renfrew, bid $499,000. The commission had referred the bids to President Taft.

Bids were opened August 16 by Col. James G. Warren, United States engineer at Buffalo, for the dredging of the section of the United States ship canal through the Niagara River from the ship canal lock at the foot of Black Rock Harbor, Buffalo, to a point opposite the head of Grand Island. The channel is to be dredged to a depth of 23 ft., with a width of 400 ft., the work to be completed June 30, 1912. The bids have been submitted to Washington for award of contract. Upon the completion of this work the largest lake vessels will be enabled to pass through the ship canal and lock (800 ft. long, now nearing completion) at Black Rock Harbor down the Niagara River. The present channel depth of Niagara River opposite Buffalo is 18 ft., limiting boats to that draft, while the current is very swift, making the passage difficult.

The New National Adjustable Spring Collet

The National Tool Company, Cleveland, Ohio, has brought out a new adjustable spring collet for automatic screw and turret machines shown in the accompanying illustrations, which is designated as the C. C. adjustable spring collet. It is claimed that this collet will eliminate spring collet expense by being nonbreakable and doing away with the necessity of having a full set of collets, and that it is a great time saver, as adjustments can be made instantly without removing the

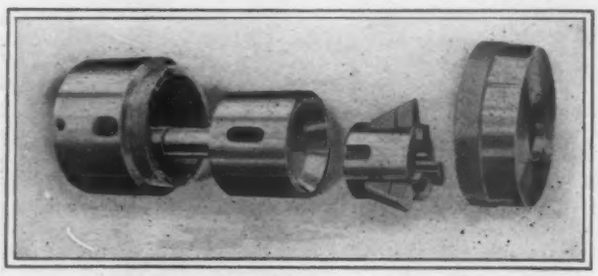


Fig. 1.—The C. C. Adjustable Spring Collet, Made by the National Tool Company, Cleveland, Ohio.

collet from the chuck. After the collet is placed in the machine the adjustment is regulated in the usual way by a screw ring which turns to the right or left to secure the desired size. This does away with the necessity of dismounting the casing or hood and collet with each change in the size of stock. The collet will grip all sizes of stock, either round, hexagon, square or octagon bars, to its full capacity, thus taking the place of a full set of ordinary spring collets. The full length of the jaws when gripping bears evenly on any stock within the capacity of the collet. They hold the stock true, and it is claimed that danger of breaking is avoided because the bearing weight is evenly distributed on each jaw. The collets are furnished with three gripping jaws for round and hexagon stock, and with four gripping jaws for round or square stock. Fig. 1 shows the collet taken apart, and Fig. 2 the collet closed with draw bar attachment for engine, speed and turret lathes. The draw-in attachment replaces a full set of the ordinary draw-in spring collets, doing away

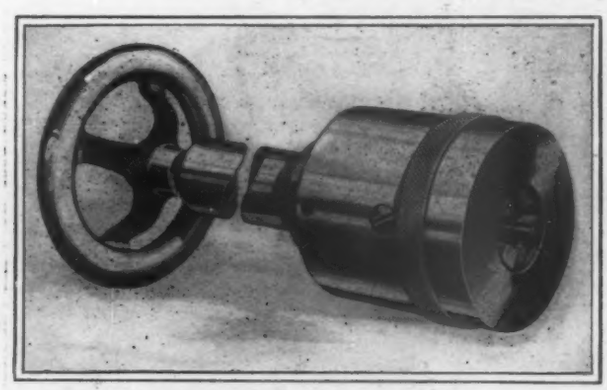


Fig. 2.—Adjustable Spring Collet Fitted with Draw-in Attachment.

with the necessity of changing from one size to another.

In the construction of the collet the casing is threaded direct to the spindle, the operating sleeve fitted into the casing and the gripping jaw holder into the sleeve, all the parts being held by an outer steel cap. The tool when closed is dustproof, and it is claimed that trouble with chips is eliminated. The casing is of crucible steel, the sleeve is of hardened tool steel, and the jaws are of hardened tool steel ground on the outside and inside.

The C. C. adjustable spring collet is made in seven sizes, ranging from No. 1, with a gripping capacity of 1-16 to ½ in., inclusive, to No. 7, with a gripping capacity of 2½ to 4 in., inclusive. The draw-in attachment is made in three sizes, from No. 1-A for 12 and 14 in. lathes, with a gripping capacity of from ⅛ to ¾ in., inclusive, to No. 3-A for 20-in. lathes and larger, with a gripping capacity of from ½ to 1½ in., inclusive.

Conditions in the British Iron Trade

Reports from nearly all British iron and steel trade centers indicate slackness in trade. Shipments of Cleveland pig iron in July were disappointing, the total being only 84,541 tons, against 117,957 tons in June. For the seven months ending July 31 the pig iron shipments from the Cleveland district were 675,525 tons, compared with 678,674 tons in the first seven months of 1901 and 825,359 tons and 1,082,524 tons in the corresponding periods of 1908 and 1907, respectively. The stocks in Connal's stores at the end of July were 444,781 tons, an increase for the month of 8732 tons. It is also believed that stocks in makers' hands increased in July. The price of Cleveland warrants dropped in the last week in July to 48 shillings 7 pence, the lowest for more than a year. A gradual advance came in the following week, however, and the quotation on August 12 was 49 shillings 9 pence.

In the finished steel trade shipbuilding material is still in good demand, and while new business is not coming in as plentifully as in the second quarter of the year the mills are well engaged in meeting specifications on old contracts. The importation of German ship plates into Scotland is due to temporary difficulty in securing shipments from local works. There has been good activity in tin plates and in black and galvanized sheets. The rail mills have closed little new business recently. The Cape Government is inquiring for 10,000 tons of 80-lb. rails.

Castings Made by a New Process

The General Foundry Company, recently incorporated at Bradford, Pa., has equipped a plant with furnaces and machinery for the manufacture of converted steel castings by its own special process, which enables such castings to compete with malleable iron and open hearth steel. The manufacturer makes strong claims for the new product as to its cleanliness, strength and comparative cheapness. It can be tempered and case hardened. During the company's operations some interesting results have been obtained, a summary of which is printed in a series of circulars which are being sent to machine tool builders, car works, railroads, &c. Copies may be obtained by addressing the superintendent, who is an experienced foundryman. A complete laboratory is used in connection with the foundry, the new castings being made by the application of scientific methods. The general sales office is at Bradford, Pa., and agencies are to be established in the larger and more important manufacturing centers. E. T. Ward is manager, C. P. Kennedy is treasurer and J. E. Coulter is superintendent. W. H. Hulme of Bradford has a large interest in the company.

The Baldwin Forging & Tool Company, which has been operating a plant in Columbus, Ohio, for the past six years, expects to move into its new plant at Parkersburg, W. Va., December 1. The main structure will be 60 x 860 ft.; steel shed, 50 x 100 ft., and two warehouses, 50 x 200 ft. each. New machinery will be installed to provide for a daily output of about 500 dozen shovels. The company manufactures shovels, spades, scoops and drain tools. Frank M. Baldwin is president and treasurer.

Conveying Machinery for Nut and Bolt Scrap

The accumulation of scrap in iron and steel manufacturing industries pending a time when the best price may be obtained for it necessitates making some provision for handling and storing it. A bolt and nut works is perhaps the best examples of one of these plants, as large piles of small scrap result from the operation of the automatic nut machines. The Columbus Nut & Bolt Works, Columbus, Ohio, has found a satisfactory means of storing and handling its scrap in a very economical way. On the main floor of the factory 17 hot press and 8 cold press machines are ordinarily employed for making nuts and the trimmings and punchings are sorted and sent to the basement by chutes where the scrap is stored until it is sold. Fig. 1 is a view in the basement of the plant showing how the scrap is loaded into an elevator and Fig. 2 shows the chute on the first floor for discharging it into freight cars.

Prior to the installation of the conveyor all the scrap was shoveled by hand. The scale due to the use of natural gas furnaces rendered the process of separating the scale somewhat ineffective as it was done by hand, a shovelful being thrown at a time against an inclined screen. The material was then wheeled to the cellar and when the time came for loading was brought back again in barrels and dumped into the cars. In this way the services of from four to six men were required for several days to load 50 tons of scrap. Since the conveyor has been installed this labor has been reduced materially. The scrap is reclaimed and removed easily from the basement storage bins by a Jeffrey continuous bucket elevator built by the Jeffrey Mfg. Company, Columbus, Ohio.

Fig. 1 shows how the scrap is shoveled into the steel receiving hopper where the buckets are automatically loaded. This scrap is taken, including the scale and dirt, and is delivered into the loading chute shown in Fig. 2. This is provided with perforated screens and may be extended to connect directly with the freight cars being loaded, and as the scrap passes over the screens the dirt and scale are separated and delivered to a by-pass which returns them to a bin in the basement. The spout is adjustable to suit the varying hights of cars and is hinged at the top so that it may easily swing back against the elevator frame to allow the sliding doors communicating with the railway yard to be closed.

Fig. 1.—View in Basement Showing Platform Where Scrap Is Loaded Into Buckets of the Conveyor, Installed by the Jeffrey Mfg. Company, Columbus, Ohio.

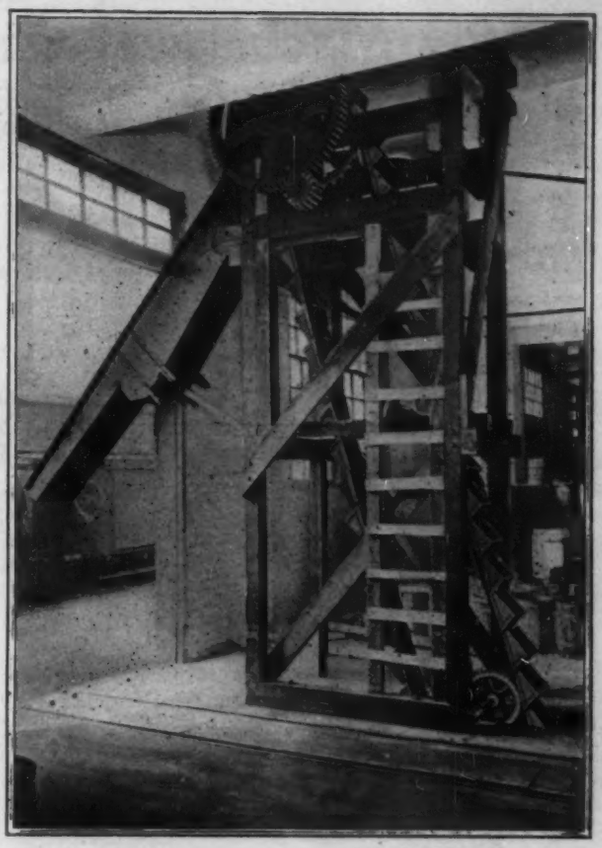


Fig. 2.—Chute on the First Floor for Discharging the Scrap Into Cars.

The elevator buckets are hung on a Jeffrey Hercules elevator chain and form a continuous steel belt having sides and back. Each bucket has a capacity of from 40 to 50 lb. of scrap. At present the elevator is belt-driven from a line shaft, but it is so arranged that it can either be run by a belt from a line shaft or directly connected to an electric motor.

At the present time there are over 900 tons of scrap stored in the basement and storage bins and it is estimated that there will be nearly a carload of scale and dirt separated from it, as this refuse amounts at an average to ½ to ¾ per cent. of the total. When the scale and dirt are separated out from the scrap, they are removed from the basement by the elevator and delivered into cars or barrows through screens provided with veils.

The National Open Shop Publicity Bureau, 34 West Thirty-third street, New York, is circulating two pamphlets. One is entitled "The Employer and the Labor Union," by Marcus M. Marks, New York, and the other "The Story of Duluth and the Open Shop." The latter is a brief recital of the establishment of the open shop by the building trades in Duluth, with a summary of the improved conditions resulting therefrom. The Labor Committee of the Duluth Builders' Exchange reports that "it has been practically demonstrated that the open shop is a great and substantial benefit to the employer, the mechanic and the city of Duluth, and the welfare of the community and its industrial progress render its maintenance of vital importance."

The Mechanical Engineers in England

The Joint Meeting of the English Institution and the American Society in Birmingham and London, July 25 to 31, 1910

In 1904 the American Society of Mechanical Engineers was joined by a delegation from the Institution of Mechanical Engineers of Great Britain in a meeting at Chicago and St. Louis. Now, the American Society has returned the visit with interest in two senses of the word—its delegation numbered two or three times that which came to America the year of the St. Louis Exposition, and it has been not only interested, but instructed and delighted as well with its elaborate entertainment.

The holding of these joint meetings approximately five years apart, alternately in England and the United States, is cementing a bond of friendship between the members of this profession in the two great English-speaking countries that is full of significance for the future. The interchange of ideas can be enjoyed to a large extent by the exchange of Transactions between the societies, but the meeting together and jointly discussing various engineering topics brings that closer touch of personal acquaintance, the advantage of which is beyond measure. It means that the spirit of competition is giving place to one of co-operation, and the whole world will reap the benefit.

At this meeting there were three professional sessions, two in Birmingham and one in London. The first interested railroad men dealing with roundhouse practice, the second machine shop men, treating specifically of high speed tools and tooth gearing, and the third those interested in the electrification of railroads. The most animated discussion was brought out in the second and third sessions; opinions differed as to proper standards for gear teeth and the relative superiority of single phase alternating current and direct current traction motors. In both instances valuable material was added to general knowledge on the subjects, and all were agreed that uniformity of standards is greatly to be desired.

The papers and discussions are reviewed in the following report, and while space does not permit of more than brief reference to the excursions and social functions that occupied a majority of the time, it may be said here of the entire programme that it was extremely delightful in every detail, and especially to the Americans, so many of whom were enjoying experiences of a kind entirely new to them. The one regret was that so many events had to take place simultaneously that it was impossible for any individual to participate in them all. A special programme was provided for the ladies' entertainment, while the men attended meetings and excursions not calculated to interest the ladies. Altogether there were present at the convention between 600 and 700. A list of the American visitors was printed in *The Iron Age* June 14, 1910, and an account of the trip over of the official party and its reception at Liverpool in the issue of August 4.

BIRMINGHAM MEETING

FIRST SESSION

Officially the convention opened Tuesday morning in the Birmingham and Midland Institute, with an address of welcome by the Lord Mayor of Birmingham, Alderman W. H. Bowater, who referred to the part which Birmingham has played in the history of engineering. Beginning with James Watt, there is a notable list of Birmingham men who have figured prominently in engineering. It was here, too, that the Institution of Mechanical Engineers was organized in 1847. From these facts and that Birmingham is still an important center of mechanical engineering, he considered it an especially appropriate city to select for the joint meeting.

George Tangye, a member of the Reception Committee, added to the words of welcome, and very gratifyingly surprised the visiting society by presenting it with a framed letter in the hand of James Watt, written in 1777. It was a part in the collection of Boulton and Watt relics which Mr. Tangye has presented to the city of Birmingham, and for which he is custodian. He himself lives in the famous house, and threw it open for the inspection of the visitors during their stay.

President J. A. F. Aspinall of the institution responded to the welcome, and recalled some additional historical events of an engineering nature with which Birmingham was associated. It furnished, through Boulton and Watt, Robert Fulton's first steamboat engine, and was the birthplace of cotton spinning by machinery—the invention of John Wyatt.

For the American Society, Prof. W. F. M. Goss, vice-president, thanked the city and the institution for its cordial reception and feelingly accepted Mr. Tangye's gift, declaring that it would be greatly prized not only by the society, but by all American engineers. At his request, Secretary Calvin W. Rice read the inscription on the frame surrounding the letter, and explained that it would be given a prominent place in the Engineering Societies' Building in New York.

President Aspinall, taking the chair, expressed regret at the absence of George Westinghouse, president of the American Society, and announced that a telegram would be sent him of the institution's disappointment that he could not attend. Secretary Worthington read the minutes of the institution's previous meeting, and report on the election of members, which concluded the items of business, after which attention was turned to the presentation of a group of papers on English and American roundhouse practice, abstracts of which follow:

English Running Shed Practice

BY CECIL W. PAGET, DERBY, ENGLAND.

This paper is divided into two parts, a description of running sheds (engine houses or roundhouses are the American terms), and some features of their management. Running sheds in England are of two types, those in which the tracks are parallel, usually called straight sheds, and those in which the tracks radiate from a center turntable, commonly called round sheds. The advantages and disadvantages of the latter type are enumerated. Illustrations are given of two sheds, the latest examples of English practice, one a round shed and the other a straight through shed. The most modern type of shear legs, used to lift a locomotive while removing its wheels, is detailed, and other parts of the equipment usually provided. Other features described are the system of keeping stock and supplies, lighting, arrangements for washing out, methods of coaling, ash pits and water softening equipment. The account of running shed arrangements comprehensively covers inspections of locomo-

tives and their parts, running repairs, washing out of boilers, reports on engine failures, cleaning, system in passing engines through the repair shops and assigning them to their drivers, and the study of the results from statistics of the work of the various sheds. This system is that practiced by the Midland Railway, of which the author is the general superintendent.

Engine House Practice

BY F. H. CLARK, CHICAGO.

The complete title of this paper is "The Handling of Locomotives at Terminals to Secure Continuous Operation." It refers to such features of design and equipment as are considered good practice in the United States. A typical engine house is illustrated and described, and different types of coaling stations, sand drying apparatus, water tanks, ash pits and turntables. In contradistinction to English practice, instead of shear legs to raise a locomotive while removing its wheels, it is the American custom to provide drop pits by means of which wheels may be removed and replaced without jacking up the engine. Other details of the engine house construction and appointments are elaborated upon, including the building itself, the pits, heating and lighting, tool equipment, storage of materials for repairs, oil, &c., and means for washing boilers. A concluding section deals with engine house organization, and gives a statement of the averaged itemized cost of engine house service per month per engine on one road with which the author is familiar.

Handling Locomotives at Terminals

BY FREDERIC M. WHYTE, NEW YORK.

The scope of this paper is limited to established practices in the United States and Canada, and deals only with terminals handling about 100 locomotives a day, supplemented by the author's personal suggestions. Initially it covers the location of terminals and the division of responsibility among departments or divisions and other details of organization. The next section of the paper pertains to the layout of a locomotive terminal generally and with special reference to the engine house, the coaling plant, the ash pit, the sanding plant and the water supply. Under "Organization" are treated the duties of the master mechanic; traveling, engine house, yard, house and shop foremen; work report clerk, and dispatcher. Finally there is an extended discussion of the assigning of locomotive crews, contrasting the old practice of a certain crew to a certain engine with the present arrangement known as "pooling," in which any crew may be assigned any engine as convenience directs. More trains can then be handled with a given number of locomotives, but there are disadvantages that require special provisions to offset, which the author reviews at some length.

American Locomotive Terminals

BY WILLIAM FORSYTH, CHICAGO.

Some of the topics handled by the other papers in the group are covered in this paper, but with special reference to a particular engine house, that of the Pennsylvania Railroad at East Altoona, Pa. The freight tonnage passing through the terminal is claimed to be the largest handled by any single system of freight yards in the world. The total capacity of the yards is 10,500 cars. An outline is given of what the traffic amounts to, the locomotives used, the character of the line, number of employees, &c., and there follows a description of the engine house. The engine house organization is next explained, and the manner of reporting and performing daily work, tracing engines, engine dispatching, and considerable concerning the organization of the staff. The results in the shape of service obtained from engines by pooling are briefly referred to in conclusion.

Handling Engines

BY H. H. VAUGHAN, MONTREAL, CANADA.

This paper discusses particularly the practice of pooling engines. As to whether it is desirable or not depends, in the author's opinion, on whether the engines are engaged in passenger or freight service, and in the latter case on the conditions which exist. He proceeds then to take up these two kinds of service separately, and concludes that in passenger service pooling is objectionable under any conditions, and should be avoided if possible, and that in freight service pooling is advisable if conditions are such that engines cannot be run with assigned crews, and probably on divisions where business is so heavy that 60 engines per day or over are dispatched from the terminal. Where assigned crews can be used on engines the cost of repairs, the amount of fuel consumed and the class of service obtained will all be more satisfactory.

The first paper was presented by its author, and the four American papers by F. H. Clark, the author of one of them, using his own as a basis and referring to the others whenever they brought up additional points.

George Hughes, chief mechanical engineer of the Lancashire & Yorkshire Railway, opened the discussion, calling attention to some differences in practice. His road has adopted the straight dead-end shed, and found no particular difficulty with it. He agreed with Mr. Paget on the desirability of hot water apparatus for washing out boilers. Their average value of stores per engine is about $41, and he asked the value on the Midland Railway. The speaker's road has six movable shops (traveling vans) and distributed stores. They use water softeners and boiler compounds very successfully; much of their water is hard. Failures average two a day, with 1000 engines under steam. Most disabilities are due to boiler tube troubles. He took it that American turntables were as large as 100 ft. (he was later corrected in this, as 80 ft. is the maximum), and contrasted theirs, which are 60 or 65 ft. and many only 55. He was particularly interested in the paper dealing with the East Altoona shop, which he visited about five years ago. He regretted that more had not been said in the papers concerning engine cleaning, which is a great feature in English running shed practice as distinguished from American practice. Concluding, he referred to the lodging houses for engine crews maintained by his road.

Mr. Aspinall was especially interested in the American way of removing wheels, using drop pits. He declared it better to drop 3 tons of wheels than lift 30 tons of locomotive. He also referred to the Hollerith tabulating machine, an American product, which the Lancashire & Yorkshire, of which he is general manager, had found of great value as a labor saver in totaling up the data on engine drivers' reports. Referring to two forms of engine pits described in a recent series of articles in an American periodical, he sketched on the blackboard a cross section of pit he prefers having a flat bottom sloping slightly to one side for draining, and indicated his objections to concave or convex pit floors.

James M. Dodge, Philadelphia, speaking as a constructor of coaling stations and not a railroad man, referred to the American diversity of practice. Most generally used are inclined trestles and overhead pockets, but practice is far from uniform, on account of the varying requirements in individual cases. For filling bins where a long incline cannot be installed, it is common to employ balanced bucket type conveyors or chain bucket conveyors. Speaking of the division of responsibility among railroad officials, he criticised the usually numerous positions of limited authority, such as master mechanic, superintendent of bridges, &c., and indorsed the Santa Fé experiment of calling them all assistant superintendents. While their individual duties are distinct, they still have power to correct directly a deficiency discovered in any department without referring it through several other heads by correspondence.

Henry Fowler of the Midland Railway expressed interest in repairs, and was surprised at the high mileage records of locomotives mentioned in the American papers. On the matter of locomotive failures, he stated that their casualties among 3000 locomotives averaged 50 a month, and that their tube troubles were few, probably due to the use of copper tubes, which seems to justify them. Further, the universal English use of copper stay bolts rid them of much of the stay bolt trouble and rigid inspections necessary in America.

H. L. Gantt, New York, alluded to a report made by Dodge & Day and himself as to the efficiency of the Angus shops at Montreal of the Canadian Pacific Railway. These shops are in charge of Mr. Vaughan, the author of one of the papers. They found the shops already very efficient, but suggested some changes that have already shown good results. The principal fault was no provision for perpetuating the improvements worked out by the employees and laying out work for the men so that none are overworked, and all are di-

rected to perform their work to best advantage. The improvements which have been made by establishing a central planning department and a system of instruction for workmen and a new wage system are to be extended over the entire road, so that all shops can be brought up to the same standard of efficiency.

A. D. Jones, Horwich, emphasized the importance of providing wheel drops in train sheds on account of the great time saving. As between round and straight sheds he agreed there were advantages in both, but that the round were particularly easy to light satisfactorily. He was in favor of keeping the same drivers to the same engines if possible.

J. E. Sague of the New York Public Service Commission and formerly connected with the American Locomotive Company, at Schenectady, N. Y., compared English and American locomotive designs, and stated that Americans would do well to study English practice, particularly in precautions to prevent failures. In several details American designers have learned important lessons from the English, and the best results will come from a closer study and cooperation between the two countries.

Mr. Clark, closing the discussion for the American authors, remarked that 80-ft. turntables are the present limit. Attempts have been made to get 80 and 85 ft. ones, but the cost was prohibitive. He imagined that the American cost for stores would be higher than the English, but had no figures to substantiate it. He commended the English railroads for their thorough cleaning of engines. Some American roads give fair attention to this work, and have their reward for the expense in the greater ease of detecting fractures which might cause trouble if not discovered. He also indorsed the design of wheel pit floor described by President Aspinall.

Mr. Paget, replying to the discussion, was also unable to state definitely the cost of stores. He agreed that the expense of cleaning is well warranted. He did not believe that in England they were yet in position to adopt such an interchange of supervision as was mentioned by Mr. Dodge. The difficulties of preventing the necessity of long hours for freight crews, he explained, was experienced but largely handled by a train control department on the Midland, similar to the dispatching department in America. Concluding he gracefully returned the compliment paid the English by Mr. Sague, in acknowledging that they in turn have borrowed largely from American design.

At the close of this session luncheon was served in the Town Hall.

TUESDAY EXCURSIONS

Seven different excursions were arranged for the first afternoon, four of which were of a technical character; the works visited are briefly described later. The other three were pleasure trips, purely, to Stratford-on-Avon, Worcester (here the Royal Porcelain Works are located) and Stoneleigh Park and Kenilworth.

The South Staffordshire Mond Gas Company.—This company was formed by special act of Parliament in 1901 to make and distribute gas for heating and power over an area of about 123 square miles, and has its plant at Dudley Port, Tipton, about 7 miles from Birmingham. The plant was completed about five years ago, and comprises eight producers, each generating enough gas to supply 2000 hp. of gas engines continuously. The fuel is brought by canal boats to the bunkers and distributed from them by two 40-ton Hunt conveyors to storage bins over the producers. The gas leaving the producers at about 550 degrees C. passes through mechanical washers, ammonia recovery and gas cooling towers, centrifugal fans, scrubbers and meters before being compressed and discharged through the distributing mains. The air blast for the producers is furnished by engine driven Root blowers and water by Lee-Howl steam pumps. All other apparatus, fans, washers, &c., is electrically driven except the gas compressors (three Fraser & Chalmers, each of 450 hp.). The exhaust steam is used in the producers so that the steam users are practically reducing valves. Steam is generated by four 500-hp. Climax boilers and electricity for power and lighting by Westinghouse gas engine sets; two three-cylinder vertical engines are used, one active and the other reserve. The gas mains vary from 36 in. in diameter down, and the gas is distributed at 5-lb. pressure, reduced at the consuming points. The total length of trunk and gas mains is now 25½ miles. Over 100 works are using the gas for all kinds of metallurgical and heating operations and for power.

The Pump & Power Company's Testing Station.—At the same site, using the gas company's gas, and compressed air for starting, is the experimental equipment of the Pump & Power Company's Humphrey internal combustion pumps, comprising four of various types, the largest a four-cycle pump, delivering 250,000 gal. per hour, against a head of 35 ft. Special apparatus is provided for the testing. The gas is exploded directly in contact with the water, the movement of a column of which controls the pump. Except for the water suction valves and the small interlocking gear regulating the inlet and exhaust valves so that only one can open at a time, there are no moving parts or mechanism, and not even stuffing boxes or glands. Any gaseous fuel may be used. For lifts above 35 ft. an intensifier is used. In a pump of only 16 hp. the coal consumption was 1.06 lb. per horsepower hour in water lifted and 0.95 lb. for a 36-hp. pump.

The Austin Motor Company.—These works, at Northfield, about 7 miles from Birmingham, cover an area of 8 acres, 6 of which are occupied by shops, and builds several designs of automobiles. The machine shop has a modern equipment of machine tools, among them the following of American make: Warner & Swasey, Gisholt, Jones & Lamson and Bardons & Oliver turret lathes; Lucas boring machines; Fosdick radial drill; Prentice, Barnes and Hoefer drills; Garvin and Milwaukee millers; Whitcomb-Blaisdell and Pratt & Whitney lathes; Landis, Pratt & Whitney and Brown & Sharpe grinders. The other buildings are a hardening shop, power house, engine test house, with plating and polishing sections; erecting shop, copper and tinsmith's shop, Chassis test house, with wheel building section; patternmaker's shop, carriage building shop and finishing shop. About 1500 are employed, for whom a mess room is provided in a special building.

The Metropolitan Amalgamated Railway Carriage & Wagon Company.—These railroad car works, at Saltley, near Birmingham, were established by Joseph Wright in 1845. They now cover 43 acres, nearly half of which is in buildings. The workmen's mess room will seat 2000. The smithy contains 42 500 to 60,000 lb. steam hammers, 5 hydraulic presses and 10 furnaces. Adjoining it is the die sinkers' shop and hydraulic press shop, served by a 5-ton electric crane and containing five furnaces, 2 hammers and 13 hydraulic presses. The smithy power house contains blowing engines supplying blast and four Lancashire boilers, two of which are fitted with the Halpin system of thermal storage. Exhaust steam from the hammers is used to heat feed water. The steel underframe shop has five 3 to 10 ton cranes, a beam end milling machine handling bars up to 70 ft. long, six six-head beam drills 50 ft. long, and the usual straighteners, plate working machinery, &c., and a full complement of hydraulic riveters and pneumatic riveters, chippers and drills. The machine shop is soon to be rebuilt and enlarged. Among the more important machines are two 24-in. slotting machines, some triple geared lathes for steel castings, special buffer turning lathes and Lincoln type high speed millers. Ten motors aggregating 290 hp. drive the equipment. Only high speed steel tools are used. The power house has a capacity of 1060 kw. in General Electric steam engine driven generators, and also contains condensing, water pumping and air compressing plant and three Lancashire and two Babcock & Wilcox boilers, each of 2000 sq. ft. heating surface. The two latter burn wood refuse. The foundry, which adjoins, with pattern shop and storage, covers 18,000 sq. ft., and can turn out 10 tons of castings per day. It is equipped with pneumatic and hand molding machines for small castings. Other buildings include packing shop for spare iron work, finishing shop, woodworking shops, saw mill (the equipment in this is driven by motors of a total capacity of 1051 hp.), car building shop, car body shop and paint shop. The whole works are lighted by electricity; over 550 arc lamps alone are used, and the total of 156 motors have a rated horsepower of 2352. The number of men employed is about 3000.

The Frankley Filter Beds.—The Frankley Works of the Birmingham Corporation Waterworks, provide a part of the city's supply. From several reservoirs collecting from a water shed of 70 square miles water is piped to Frankley for filtering. Here through a service reservoir divided in halves the water is decanted from one-half to the other, removing the grosser impurities, and is then passed through 18 filter beds of a total area of 14 acres. The filtering medium is fine sand superimposed on gravel. At present the average quantity of water filtered daily is nearly 20,000,000 gal. This is delivered to two pure water reservoirs. Part of the supply is pumped to two high level reservoirs.

GARDEN FETE

A rare treat for the Americans at least was the garden fête, held Tuesday evening in the Botanical Gardens at Edgbaston by invitation of the Birmingham Reception Committee. The Lord Mayor and Lady Mayoress of Birmingham and the chairman and vice-chairmen of the Reception Committee and the chairmen of the Executive and Ladies' committees received. The extensive gardens were beautifully illuminated, music was furnished by the Portsmouth division of the band of the Royal Marines, and refreshments were served in a large tent, concluding with a display of fireworks in the center of the garden.

SECOND SESSION

In the same place that the first session was held the second convened Wednesday morning, and proceeded at once to consider the first paper, an abstract of which follows:

High Speed Tools and Machines to Fit Them

BY H. I. BRACKENBURY, NEWCASTLE-ON-TYNE, ENGLAND.

After briefly reviewing the history of high speed steel tools and the gradual extension of their use in the 10 years since they were first introduced, the author defines the properties that make it useful and the three general classes in which such steels may be divided: A, for cutting mild and medium steel; B, for cutting hard steel, and C, for cutting very hard steel and for use where a sharp and lasting cutting edge is required. With regard to the power required to remove material, it has been found that more is required for a thin wide chip than for one of double the thickness and half the width, and at high speeds less power is required than at low speeds up to a certain point. It is difficult to lay down rules for cutting speeds, as conditions are so variable and it may be more important to preserve the edge and avoid frequent sharpening than to use the highest allowable speed. The proper cutting angle for a tool is the sharpest which will not break at the edge, as the sharper it is the less power is required. As high speed steel has improved, it has been found possible to make the cutting angle more acute. On turret lathes the highest class of high speed steel is now being used and in tools with a very sharp cutting angle. In twist drills the steel has been found particularly valuable, increasing the amount of work done in a given time threefold as compared with tempered steel drills and reducing the frequency of grinding. Generally speaking, full advantage is not taken of the cutting powers of high speed steel. The author advocates setting aside certain machines for roughing only. Usually old machines have enough power for finishing, and increasing their belt speed, so that they may be run with the back gear in, makes them efficient. Regarding considerations affecting the fitness of machines for the use of high speed steel, it is pointed out that more is involved than the mere ability to remove a large amount of metal in a short time, if such a demand upon it is infrequent, as such a machine is expensive for use on light work and when idle. A machine should be selected with reference to the kind of work it will have to do most of the time. Objections to cone driven machines are mentioned, and the greater desirability of geared speed changes or variable speed motor drive; also the necessity of accurately cut gears and amply strong feed mechanism. The paper concludes with a summation of the characteristics which should be possessed by machine tools using high speed steel, including roughing lathes, turret lathes, slotting machines, radial drills, milling machines and planers, and is supplemented with tables of data on high speed twist drills, turning tools, milling cutters, &c.

John Calder, Ilion, N. Y., speaking of the turning of locomotive and car wheel tires, mentioned some excellent records. In a shop of which he has knowledge the average output is eight pairs of locomotive tires turned in 10 hours, where five to six pairs is the usual standard. The tool was a Niles-Bement-Pond lathe. Many shops are turning 16 to 36 pairs of car wheels a day. The speaker showed lantern slides of a number of modern American tools, giving brief accounts of their features and principal dimensions. Among those so shown were Niles-Bement-Pond and Lodge & Shipley lathes, a Bullard vertical turret lathe, Niles-Bement-Pond and Cincinnati heavy millers, Gould & Eberhardt gear cutters, and a Pratt & Whitney new vertical grinder.

L. D. Burlingame, Providence, R. I., described an interesting boring fixture for duplicate work and the use of operation sheets in connection with operations of milling on a Brown & Sharpe machine. He also described continuous milling on a No. 5 vertical milling machine, and gave some records of high speed milling (gear cutting), using an air blast for cooling the cutter. He concluded with some accounts of notable grinding operations.

L. P. Alford, New York, had prepared a discussion abstracted from three articles which had appeared in the *American Machinist*, giving the results of tests on a number of rapid production machines. This included as among the most remarkable performances mentioned, that of a Colburn upright drill using Celfor twisted drills.

Charles Wicksteed, Kettering, England, agreed with a statement made in the paper that it is a pity more use has not been made of the arrangement fitted to the planers designed by Sir Joseph Whitworth for cutting on both strokes, and referred at greater length to the reversible tool holder, which does away with an idle stroke. Double cutting, he stated, has had a slow growth, but has certain advantages that will mean its more extended use. One use of two tools is to have the leading one cut through the scale, so that the following one enters clean metal. The situation is reversed on the return stroke. The cut is, therefore, divided between two tools. He thought that users of motor driven machine tools will come to realize the cost of power and see the desirability of eliminating an idle stroke. Still he granted the sufficiency in many kinds of work of a planer with quick return motion; for example, where the time of setting tools for double cutting would be a loss of advantage. Both quick return and double stroke have their field of usefulness, and he was pleased that the author had called attention to the advantages of double cutting.

William Lodge, Cincinnati, Ohio, emphasized the fact that high speed in the tool equipment is not the only consideration. How to get the best results from the workmen, route the work through the shop, and kindred provisions for increasing output are equally important. He spoke further of the need of greater attention to system in manufacturing.

Dempster Smith, Manchester, England, remarked the comparison in the paper of past and present practice, and agreed with the author that makers should guarantee the capabilities of their machines. Should a certain efficiency be required between the belt and the net power, he believed a great many gear drives would be modified or withdrawn altogether. He commented on experimental work and its value, holding that commercial results only are the true measures of usefulness. He also referred, as had the author, to the paper presented before the American Society by F. W. Taylor on "The Art of Cutting Metals," calling attention to the formula therein given for finding the proper cut to be taken, and showed how he considered it could be simplified.

Walter Carter, Sheffield, England, disputed the need in any shop of three varieties of tool steel, and regretted that the author had not given more about the economies of using the latest tool steels. He declared that round nose tools are wrong in principle, and that all cutting edges should be straight, so that the chips will roll off like paper and not waste power in being deformed. As another thing in shop practice that needs correcting, he mentioned grinding equipment.

F. W. Taylor, Philadelphia, Pa., was called upon, and though he had nothing to add concerning high speed steels, he wanted to second the statement made by Mr. Lodge of the need of system to increase production. He averred that the average shop in the United States could have its output doubled with present men and machines, and believed conditions are the same in England. It is also a partial solution at least of the labor problem. It will give the men what they want, higher wages and shorter hours. A scientific

study of the motions of the workmen, if properly carried out and its lessons applied, would result in greatly increased productivity.

In his closure the author expressed his appreciation of Mr. Taylor's remarks on motion study, and indicated that it has been applied in machine tool design by improving the facility of making speed and feed changes and placing all controlling levers within convenient reach of the operator. With Mr. Carter's declaration of the superiority of square edged tools, he took exception, maintaining that they make a rough cut.

The next two papers were presented by their authors, and discussed together, being on the same general subject. In substance they were as follows:

Tooth Gearing

BY A. D. STEVEN, BIRMINGHAM, ENGLAND.

The aim of this paper is to provoke discussion that may lead to more uniformity in opinions as to different methods of cutting gears and on various modifications for proportions of teeth. It applies more particularly to comparatively fine pitch gears, need having increased in recent years for greater accuracy in the cutting of such gears that they may run more smoothly and noiselessly at high speeds. Commenting on gear cutting machinery, the author, for bevel gears, favors generating machines of the Gleason and Bilgram types, but acknowledges the advantages of machines using formers; for spur gears, the rotary cutter type, such as the Brown & Sharpe, for its speed of production, but laments that its gears will not interchange with spur gears generated on Fellows gear shapers or Reinecker gear planing machines, and also discusses the advantages and disadvantages of the present popular hobbing process; for worm gearing the common methods of production are satisfactory. What evidently is most needed is any change in tooth proportions that will enable gears cut by any of these typical processes to interchange. The author considers an increased angle of pressure, the first alteration desirable, say, from the present common 14½ to 20 degrees, or, at most, 22½ degrees. This increases the strength of the tooth by broadening it at the base. Engravings from photographs of gear tooth models illustrate the author's comparison of teeth of various standards, generated and cut with rotary cutters, showing their inability to run satisfactorily together, and also reasons for a greater pressure angle. The author favors a short or stub form of tooth and a 20-degree pressure angle. It can be used down to a 12-tooth pinion in its true form and cut on either a single cutter or a generating machine; it is stronger than most commonly used forms; a very large proportion of its face does useful work, and the possible objections on the score of less contact and greater bearing pressure are so slight as to be nearly negligible.

Interchangeable Involute Gearing

BY WILFRED LEWIS, PHILADELPHIA, PA.

The author of this paper is the chairman of a Committee on Standards for Involute Gears appointed about a year ago by the president of the American Society of Mechanical Engineers to investigate the subject of interchangeable gears, and if desirable recommend standards. The paper is not a report of that committee, but explains somewhat the line upon which investigation has been made and is offered in the hope that it may draw out helpful criticism or approval. Responses to a circular letter to gear manufacturers showed great diversity of opinions. From the extent to which the present 14½-degree angle of pressure is established, some argue, that even if it is not the most desirable it would be annoying to change it or recommend any different standard which may simply add another system to those already in use and increase correspondingly the stock of cutters required. In this the author does not concur. A number of correspondents were of the opinion that because of the extending use of the hobbing process, the standard should conform to its work to insure interchangeability with all gears otherwise cut, but with pinions of fewer than 12 teeth, it appears that some modification of the involute curve will be necessary unless a larger than 20-degree angle of pressure is adopted. If such modification becomes necessary many feel that the method should be known and clearly defined to permit any makers of gears to make their own cutters. Of first importance in gearing is quiet and smooth running, then strength, durability and permanence of form. Friction and journal pressure are of less importance, but are to be tested by apparatus, the committee has devised which is described in the paper, and with which will be compared the Brown & Sharpe 14½-degree standard, the 20-degree stub tooth and 22½-degree tooth with addendum of seven-eighths the module, or about 0.278 pitch, and an effort will be made to record graphically the noise produced under different conditions of center distance. Hugo Bilgram, a member of the committee, has proposed as one method of avoiding interference in gears of small numbers of teeth, increasing the addendum. Though undesirable from the standpoint of interchangeability the possibilities of this are interesting and are discussed in the paper. Plans proposed by other members of the committee are also referred to, and the author concludes with his own recommendation—a system with a pressure angle of 22½ degrees and an addendum of seven-eighths of the module, adhering to the true involute form and avoiding empirical modifications while obtaining results comparable with the best now obtained by such means.

In presenting this paper the author supplemented it with data which has become available since the paper was written from tests made with the committee's apparatus. The main conclusion was that in no instance was the friction loss of sufficient magnitude to exercise a controlling influence upon the type of gear tooth to be recommended or adopted. The least friction was given by the gears of 20 degrees and 22½ degrees angle of pressure, which should further commend adopting a pressure angle and an addendum that will completely eliminate interference between a 12-tooth pinion and a rack. No modification from true involute form would then be required, the system would be clearly defined, and any of the methods of gear cutting now in use could easily be adapted to insure interchangeability.

The discussion was opened by P. V. Vernon, Coventry, England, who affirmed that the quality of silence is the thing most needed in gears, and that when that has been obtained it will be time to consider making them interchangeable. He hopes to see co-operation between the committees of the two societies.

C. R. Gabriel, Brooklyn, N. Y., had sent a written discussion, which was read by Secretary Rice, giving it as his opinion that the present so-called Brown & Sharpe standard will hold its own against any system for the general run of machinery, and that the benefits of modifications in the form of tooth are more imaginary than real. Better material and better hardening will remove most difficulties arising where high speed, durability and efficiency are required. However, certain modifications from theoretical tooth form give decidedly better results in practice, and he sees no reason why manufacturers of cutters should define such modifications as they make, as it is cheaper and more convenient to purchase stock cutters from reliable manufacturers than for gear manufacturers to attempt to make their own. He did not agree that all cutters should conform to hobs, as the hobbing process has its limitations. He favored the 20-degree pressure angle stub tooth, because it permits making more durable cutters for gear shapers and reduces the difficulties in making satisfactory hobs. However, the larger pressure angles are objectionable because of increased angular back lash, as compared with the 14½-degree standard for a like amount of wear, and decrease of addendum is decidedly objectionable in the small pitches, as the likelihood of error in depth of tooth and center distance of shafts remains constant for all pitches and sizes of gears; the present addendum is none too great, and for some purposes is increased with advantage. While the stub tooth has greater strength he does not consider it as satisfactory for all around service.

L. D. Burlingame, Providence, R. I., expressed the opinion that all plans for modifications suggested would require more cutters in a set, which he feels would not be approved by manufacturers.

Before the meeting adjourned resolutions of thanks to the Lord Mayor, Mr. Tangye and the various manufacturers and others in Birmingham who had contributed to the entertainment of the two societies were passed. Luncheon was again served in the Town Hall, and in the afternoon two alternative excursions were provided.

WEDNESDAY EXCURSIONS

University of Birmingham.—The university is the successor to the college founded by Sir Josiah Mason in 1875.

The original buildings are in Birmingham and the new buildings at Bournbrook, about 3 miles from the center of the city. The site is 25 acres, and an additional 19 acres was donated by Lord Calthorpe in 1907 for college games. The present departments are physics; chemistry; mechanical, civil and electrical engineering; mining and metallurgy. A power station furnishes electricity for power and light, steam for heating and Mond gas for various departments. Near it are a foundry, forge shop and a building for large furnaces and an experimental plant for the metallurgical department. An experimental mine covers an area of about 1 acre. The cost of the buildings already erected, including the Great Hall, was about $2,650,000. All of the departments have splendid equipment, the mechanical a machine shop, pattern shop (both filled with modern tools), drafting room, machinery museum, and an excellent gas engine laboratory; the electrical an extensive experimental laboratory; the civil an experimental hydraulic installation, and a testing laboratory, whose three largest machines are a 300-ton Avery, a 100-ton Riehle and a 50-ton Buckton machine (the first will take test bars 25 ft. long); the mining and metallurgical departments have a coal mining laboratory, drafting room and a metal mining laboratory for treating nonferrous ores, and numerous other laboratories and lecture rooms, as well as the furnace building before mentioned. A feature in the latter is a 2-ton Siemens steel furnace.

Mitchells & Butler's Brewery.—The business was founded in 1862. Malt is manufactured on the premises, the mechanical features in connection with which are very complete, including elevators, belt and screw conveyors and automatic weighing machines. Perhaps most of interest throughout the brewing process are the extensive provisions for keeping dirt and germs from contaminating the product and for insuring cleanliness in the cask and bottling departments. Electricity is largely used for power and lighting, and there are numerous steam and gas engines. The water supply is abundant and pure, principally obtained from deep artesian wells by the compressed air method.

BIRMINGHAM RECEPTION

The concluding event in the Birmingham programme was a reception Wednesday evening in the Council House by the Lord Mayor, Alderman W. H. Bowater and the Lady Mayoress, followed by music and an entertainment and a collation. The presidents of the two societies took the occasion to acknowledge the unusual courtesies which had been extended by the Lord Mayor, to which he responded gracefully and with much wit.

THURSDAY EXCURSIONS

No professional sessions were held Thursday. The excursions occupied the entire day, and each of the four alternative ones had its ending in London. All travel from the time the visitors reached Birmingham until the end of the meeting in London was furnished as a part of the entertainment, and was mainly by special trains, buses and launches.

One excursion passed through Coventry and Rugby, visiting one of the following works in each place:

Alfred Herbert.—This firm, established in Coventry in 1888 to manufacture machine tools, at present employs 1500 men. The product includes horizontal and vertical milling machines, turret lathes, automatic screw machines, automatic turning machines, light drills and universal grinders. The head works are in Butts, and the foundry and branch works at Edgwick, devoted to the building of milling machines. All machines are built in considerable lots, and with extensive use of special jigs and tools. The piecework system is employed. Particularly noteworthy in the equipment is the turret lathe department containing a battery of automatic screw machines used for making bolts, screws, handles, &c., from the bar, and a battery of automatic turning machines handling chuck work made from castings or steel blanks. A large part of the firm's business consists of supplying machines complete with outfits of tools for producing work to sample and guarantees of production are given. The testing department, where it is determined whether or not these guarantees are fulfilled, is of special interest. Group drive is employed, with each lineshaft driven by an electric motor. All main and countershafts are supported from the building columns and, as no heavy snows are experienced, an extremely light roof construction is possible. Following the inspection of these works luncheon was served in a new and as yet unoccupied building, and at its conclusion the Mayor of Coventry, Alfred Herbert, and General Manager Oscar Harmer addressed the visitors.

Daimler Motor Company.—This builder of motor cars has shops covering 14 acres at Coventry and Radford adjoining, and the entire site is 35 acres. It employs 4000, and turns out 50 cars a week, ranging from 15 to 57 hp. The crafts represented include molding, machinery, fitting, engine testing, erecting, car testing, coach making, painting, trimming, finishing, smithing, coppersmithing, electroplating, &c. When extensions in progress joining the foundry and erecting shop are completed the building will be 1340 ft. long by 180 ft. wide. Lighting is by electricity and incandescent gas. The heating is partly direct and partly indirect. The four-story machine shop has an up to date equipment electrically driven largely by individual motors. In all there are 180 motors, part of the power for which is generated by two 320-hp. Diesel engines. The engine testing department has more than 100 benches; both rope and electric brakes are used. All materials, raw and in course of manufacture, are tested in the laboratory, and its staff also supervise the heat treatment of parts, to which special attention is paid. In the body department an interesting shop is that making metal panels where the oxy-acetylene welding process is extensively used. In the erecting shop frame rivets are heated electrically and headed by a hydraulic riveter. All work is done on the premium bonus system.

Willans & Robinson.—At Rugby are this firm's Victoria Works, occupying 23 acres. The principal products now are steam turbines, steam and oil engines, condensing plants, pumps, &c.; it was originated in 1881 to construct steam yachts and launches and small marine engines. The 1000 employees, if they desire, are served breakfast and dinner in a mess room by a caterer, who for the use of the room and its appliances, a small salary and other advantages, is required to cook without charge provisions brought in by the men themselves. The main buildings are pattern shop, packing and shipping shop, machine and erecting shop, in which are also the forges, foundry and pattern storage. Stock is kept in steel bins and racks to reduce fire hazard. In the larger buildings, with contents generally noncombustible, wood is found only in the wood block floors and a small amount of wood lining in the roofs. The packing shop, pattern shop and pattern storage are isolated on account of their necessarily inflammable contents. The testing department is connected by a 3-ft. gauge railway, with the erecting shop from which engines, turbines and pumps may be brought for testing. The company has its own lighting and power station.

British Thomson-Houston Company.—This company, located at Rugby, manufactures electrical traction motors, generators, incandescent and arc lamps, Curtis steam turbines, rotary converters, electrical measuring instruments, high and low tension switches, and electric heating and cooking devices. The site comprises about 25½ acres, of which about half is occupied by buildings. The works were erected in 1900, and have a total floor space of 429,826 sq. ft. The 56 buildings are mainly of brick and steel construction. Progress of the work through the shops is continuous from raw material receiving end to testing and shipping end. Precautions against fire are complete. Heating and ventilating are combined in a warm air system. The tools consist largely of English and some American and Continental makes, and are all electrically driven, except the pneumatic and hydraulic machines. Small tools are grouped and large ones individually driven. Interchangeability of manufactured parts is secured by the use of jigs and fixtures. Special attention has been given to testing and inspection of parts and assembled products. The number of employees is about 2100.

The excursion passing through Litchfield gave opportunity to visit the Pipe Hill pumping station of the Southstaffordshire Waterworks Company, the Litchfield Cathedral, the birthplace of Dr. Samuel Johnson and the old grammar school attended by Johnson, Addison, Elias Ashmore, Garrick and Darwin. Luncheon was served in the George Hotel.

The Pipe Hill Pumping Station.—This station with 15 others and 15 reservoirs supplies a population of 694,000, covering an area of nearly 300 square miles and extending 40 miles in one direction. From this station the water is pumped to a reservoir 9½ miles distant. The plant at present contains one horizontal engine complete with bore hole and force pumps with space for another. The boiler house has three 8 x 30 ft. Lancashire boilers. The engine is of the compound, tandem, Corliss, surface condensing, rotative type, and was built by Hathorn, Davey & Co. of Leeds. The double acting force pump is behind the low pressure cylinder, the latter behind the high pressure, the crankshaft carrying the flywheel between the bore hole pumps and high pressure cylinder, and the two single bore hole pumps are worked by compensating levers actuated through a connecting rod by the engine crankshaft. The engine will pump 2,000,000 gal. per 24 hours from a depth of 300 ft., and deliver it against a head of 433 ft. at a speed of 180 ft. per minute. The stroke of the engine is 5 ft., and that of the bore hole pumps 5½ ft. The steam cylinders are 32 and 62 in. in diameter; the force pump barrel, 15¾ in., and the bore hole pump barrels, 15 in.

The third excursion was entirely a pleasure one, passing through Kenilworth, Warwick and Stratford-upon-Avon, visiting Kenilworth Castle, Guy's Cliff, Warwick Castle and Shakespeare's birthplace and Anne Hathaway's cottage, and the fourth excursion was the same but made in reverse order. In addition to these excursions a number of individual visits to works were arranged for.

LONDON CONVERSAZIONE

By invitation of the president and council of the Institution of Mechanical Engineers a conversazione was held in the Institution House, Storey's Gate, St. James' Park, Westminster, Thursday evening. President and Mrs. Aspinall received, music was furnished by the band of the Royal Artillery, and by vocalists and instrumentalists, and Dr. H. S. Hele-Shaw gave a short lecture with lantern illustrations on "Stream Line Experiments, Illustrating Aeroplane Stability," which was of fascinating interest.

LONDON MEETING

The third and last professional session was held Friday forenoon in the lecture hall of the Institution of Civil Engineers. The vice-president of that institution made an address of welcome, which was responded to by President Aspinall for the Institution of Mechanical Engineers, and Vice-President Goss for the American Society. The papers considered dealt with railroad electrification, and were presented in succession and discussed *en bloc*. The first two papers were given in abstract by their authors. Mr. Potter's was presented by H. H. Barnes, Jr., New York; Mr. Pomeroy's, by title, by Secretary Rice, and President Westinghouse's paper by C. F. Scott, past-president of the American Institute of Electrical Engineers. Abstracts of the five papers follow.

Electrification of Suburban Railways

BY F. W. CARTER, RUGBY, ENGLAND.

This paper discusses electrification of suburban railways as a means of regaining the traffic lost to tramways and motor omnibuses. Experience with the 18 electric railways now in operation in Great Britain shows that with the apparatus as now perfected there are very few breakdowns and delays and but small expense for repairs—0.06 penny per car mile (roughly 0.3 cent). Most of these roads use motor trains with multiple unit control. As a rule, the expense of operation is principally dependent upon the frequency of the stops, as most of the power is consumed in accelerating trains. The electrical losses during acceleration, the author declares, are approximately equal in direct current and single phase alternating current systems, in spite of the rheostat losses in the former, as the energy loss in single phase motors is much greater. The author sees little prospect of a general electrification of the country's railroads, as the expense would not appear to be justified by the advantages to be gained, except for heavy suburban service.

The Cost of Electrically Propelled Suburban Trains

BY H. M. HOBART, LONDON, ENGLAND.

The relative advantages of steam and electric train operation, according to the conditions existing in the vicinity, or the nature of the traffic, are discussed in this paper, and particularly the comparative costs of single phase alternating current and direct current systems. The paper analyzes the cases of four typical trains, two 150 ft. long and two 180 ft. long, one in each case driven by direct current motors and the other by single phase. The author's conclusions are that "the selection of the electrical system and also the determination of the service to be provided as regards schedule speed, distance between stations and intensity of traffic are all matters demanding the most careful attention, and that they are independent;" also that "the more severe the service and the more intense the traffic, the greater is the superiority of the continuous (direct current) system." He repeats a recommendation he made in 1904 that roads adopt 1200 volt direct current systems (upward of a dozen already have) and the increase in economy will further accentuate the contrast between the direct current and single phase systems.

The Economics of Railway Electrification

BY WILLIAM BANCROFT POTTER, SCHENECTADY, N. Y.

The author of this paper holds that single phase and three-phase alternating current rolling stock equipments are applicable only to exceptional conditions, and that for city and interurban service and for the electrification of steam roads, where the density of traffic requires a relatively large investment for rolling stock, as compared with that for a secondary distribution system, and the substation apparatus, direct current of 600 volts or higher, is most suitable. In short, the type of rolling stock equipment may be more important to economy of first cost and operation than the scheme of power distribution. In mountainous regions where the ability of a three-phase equipment to return energy to the line by operating the motors as generators when coasting down grade figures, that system has its advantages, but in all other cases it is a question of deciding between single phase and direct current. Purchased single phase current is furnished usually at 25 to 60 cycles, while for traction not more than 15 cycles is the preferred frequency, consequently rotary frequency changers may become as necessary as rotary converters are to a direct current system. The direct current equipment on account of its better efficiency and lower weight offsets the rotary converter and conductor losses so that the amount of energy required will therefore be about the same in either case for trunk line service. The paper proceeds to elaborate on the conditions which determine a choice between these two systems with a general leaning in favor of direct current, and the opinion that a standard system for all classes of service, while desirable, is impracticable. For interurban roads the author is pronouncedly partial to direct current, particularly at 1200 volts, and gives his arguments. In his conclusions he states that electric locomotives are well adapted for handling trains of cars that cannot be individually equipped, but that otherwise multiple unit control provides the most efficient handling of traffic.

The Electrification of Trunk Lines

BY L. R. POMEROY, NEW YORK.

This paper professedly approaches the subject from the standpoint of commercial considerations, assuming that from a physical and mechanical viewpoint electric traction is entirely adequate for railroad service. Extra capital will be involved in any system of electrification, and before it is decided upon assurance should be had that the net receipts will sufficiently increase to pay the interest on the additional investment, either by decreasing working expenses, increasing the revenue, or both. Sections, at least, of nearly all steam roads would return larger profits if electrified. To warrant a change, however, anywhere it must be possible to accomplish something with electric traction that is now impossible with steam. The author proceeds to show by data that the cheaper cost of power electrically supplied may be offset by traffic conditions, particularly in view of increased capital outlay, and declares that "the only cases where electric operation is commercially justified are in congested local passenger situations," and then "only when a large increase in business has been realized." Electric operation shows to greatest advantage in urban and suburban passenger service. With multiple unit trains, for example, the high rate of acceleration possible permits schedule speeds that cannot be maintained in steam operation. A more frequent service can be given without proportional increase in expense and light trains run with correspondingly reduced energy consumption. Better service will attract more travel, but this holds only for urban and suburban passenger service and not for trunk lines, and especially freight service. The author concludes with a discussion as to how to determine when improvements are justifiable, citing examples where they were made, and the results and where they were not made and why.

The Electrification of Railways

BY GEORGE WESTINGHOUSE, PITTSBURGH, PA.

In this paper the president of the American Society of Mechanical Engineers congratulated the president of the English Institution of Mechanical Engineers, and paid special tribute to the latter's observations on the effects of low center of gravity and heavy inflexible motor trucks upon the permanent way which called attention to costs that at first were not considered with sufficient care.

The author expressed his belief that "the increased capacity of a railway and its stations, the economies of operation and other advantages will bring about the systematic electrification of steam railways," and his wish that "the progress of the art may not be hampered and such electrification of our main lines delayed or rendered unprofitable by mistakes, which experience, judgment and foresight may enable us to avoid." The purpose of the paper is to emphasize the need of an agreement as to fundamental standards of construction so as to permit interchange of traffic. Present diversity of practice is deplored. It is further indicated that the great difficulty now is not the developing of suitable equipment, but the question of financial and general policy looking to the future electrification of railroads generally and not isolated cases of limited extent. For interchange of traffic the fundamental requirements for both steam and electric operation are given as: A standard gauge of track,

standard or interchangeable types of car couplers, brake equipment and heating apparatus and a uniform system of train signals, and in addition for electric operation uniform voltage and periodicity of current supply, location of conductors and the current collecting contacts of cars and locomotives of various lines and uniform types of control apparatus. As to choice of form of current supply, the author unqualifiedly favors alternating current, and particularly single phase motors. Details of a notable system of the latter character, the New York, New Haven & Hartford are given. With regard to their speed characteristics and other considerations affecting their suitability for train operation, direct current and three-phase and single phase alternating current motors are compared, showing mainly in the favor of the last named. The transmission system frequently becomes the most important factor in the cost of electrification and the relative simplicity of that for single phase operation is marked when contrasted with those for the other two types. Finally the author analyzes the requisites for a universal electric system, and regarding the future of electrification of railroads urges the need of determining the system which admits of the largest extension, and of promptly selecting standards which will allow complete interchange of traffic. Appendices describe the single phase system on the New York, New Haven & Hartford Railroad give data on electric locomotives of American design, a comparison of systems of electrification, review data upon electrified steam roads and electric roads for trunk line service and recount the early history of single phase railway motors.

The discussion took the form largely of a debate upon the relative merits of single phase and direct current motors. It was opened by Mr. Parshal, engineer of the Central London Railway, who told of some of the limitations imposed on companies operating in England, as, for instance, not being allowed more than a seven-volt drop in the ground return, &c. The New Haven system could not be operated in England, on account of the Board of Trade regulations. Where motor trains are used, single phase current, the speaker held, is not to be considered. He thought that beyond question of a doubt the single phase system is more expensive in first cost, will not give the same acceleration and is more expensive to operate.

R. D. Dale of the Midland Railway Company expressed the belief that main line electrification is imminent. He gave a paper before a joint meeting of the civil engineers, in which he showed that the single phase system does not have the disadvantages attributed to it. The Midland Railway's experience with the single phase system has been very satisfactory. In conclusion he criticised some of the figures in Mr. Hobart's calculations.

Greenwood Stirk, Halifax, had hoped to hear something from the Americans on track wear. He thinks that English wear is excessive, and believes it is worse with multiple unit trains. He attributed this to power being applied to push the train, forcing the car wheels to bear against the sides of the rails, and stated that this wear is not felt when the force is always in the nature of a pull as from a locomotive.

C. F. Scott spoke generally of the various special advantages that may come from electric operation, among them the ability to superimpose tracks and to build over railroad yards as a result of the elimination of steam and smoke. He made a general comparison between single phase and direct current systems, and he also thought Mr. Hobart's figures needed correcting, as very slight differences in assumptions (on which the author's calculations were largely based) may make considerable differences in results. An Indiana single phase road, he stated, makes the highest schedule speed in the world, and is the cheapest per car mile of any in the State.

A telegram from Phillip Dawson expressed his chagrin at being detained from reaching the meeting, as he wished to refute Mr. Hobart's figures, claiming that errors in assumptions vitiated the value of the results and conclusions, and that he would submit later written discussion.

Mr. Hobart, referring to Mr. Potter's paper, conceded that in the case the latter quoted single phase was preferable to direct current, but maintained that wherever this is true steam operation is superior to either.

Angus Sinclair, New York, did not concur with Mr. Westinghouse in anticipating eventual electric operation of freight trains. He thinks from his observation of railroad practice on the American continent that the chances for electric operation are very slim indeed.

A. B. Wilson, Belfast, declared three facts had been established. On suburban roads of moderately heavy traffic electric operation is capable of greatly reducing costs; adoption of electric traction is the only means of competing with other roads, and there are cases of extremely heavy freight traffic in suburban sections that would warrant electrification. To a railroad man, he said, two methods are confusing, still he was surprised that Mr. Westinghouse advised the adoption of the single phase system to the exclusion of all others. He thought it would be desirable, but impracticable.

Prof. F. R. Hutton, New York, agreed with Mr. Sinclair that it is a little premature to talk of electrifying everything; for instance, long tracks over the prairies where freight trains are hauled thousands of miles.

The authors or their representatives closed briefly and without bringing out any additional points. President Aspinall told of the experience of the London & Southwestern, the first in England to be electrified, and ventured that the saving of crew time and reduction of labor expense are more important than any details or methods.

The professional part of the convention was then adjourned, with votes of thanks from the visitors generally, proposed by President Aspinall, to those who had had a part in entertaining the two societies, and by Vice-President Goss, to the institution on behalf of the American Society.

Friday afternoon was left to the individual's disposition. Garden parties were given by Past-President William H. Maw and Mrs. Maw and Sir John Thornycroft and Lady Thornycroft, and the museum of the Public Record Office, containing the Domesday Book and other historical documents, was open to the visitors. Several availed themselves of the invitation to inspect the mechanical plant of the London *Times*.

INSTITUTION DINNER

As the concluding and principal social function of the convention a banquet was tendered by the institution to the officers and members of the American Society in the Connaught Rooms, Freemasons' Hall, London, Friday evening. President Aspinall presided, and following the loyal toasts gave "The Health of the President of the United States," which was acknowledged by the American Ambassador, the Hon. Whitelaw Reid. The other toasts were "The American Society of Mechanical Engineers," proposed by Sir William H. White, past-president of the institution, acknowledged by Prof. F. R. Hutton, past-president and honorary secretary of the society; "Our Other Guests," proposed by Edward B. Ellington, vice-president of the institution, acknowledged by Dr. R. T. Glazebrook, director of the National Physical Laboratory, and "The Institution of Mechanical Engineers," proposed by Dr. W. F. M. Goss, vice-president of the American Society, acknowledged by the president of the institution.

SATURDAY EXCURSIONS

The last and in many respects the most delightful of the excursions occupied the entire day, Saturday. By special trains half of the party was taken to Windsor and the other half to Marlow, each taking launches on the Thames to the other town and passing one another on the 13-mile sail through one of the most picturesque parts of the river. Trains again returned them to London. At Windsor both sections had the pleasure of visiting the historic old castle and under

the guidance of the Mayor of Windsor, Councillor C. F. Dyson were shown over the ground, and were so favored as to see St. George's Chapel, which was open to the public for the first time since the death of King Edward VII. All were taken through the State Rooms in the Castle.

In the evening some visited the Japanese-British Exhibition at Shepherd's Bush, and Sunday afternoon many went to the Zoölogical Gardens, Regent's Park, for which tickets were furnished. In the evening Westminster Abbey was visited by invitation of the Dean, where the party was shown through the chapels and other parts of the ancient edifice, inspected the memorial window recently dedicated to Sir Benjamin Baker, civil engineer, designer of the Firth of Forth Bridge and the Ashokan Dam, and remained for evening service in the nave.

From the little space that could be given in a report such as this to other than the technical features of the convention programme, it must still be evident that the institution's committees having in charge the preparations for this meeting were remarkably thorough. Much as Americans pride themselves on their ability to entertain professional visitors, it is a question if they have not something yet to learn from their English cousins.

Bliss Sheet Metal Working Machinery at the Brussels Exposition

[*The following description of one of the most prominent American exhibits at the Brussels International Exposition was specially prepared for The Iron Age a short time ago. Notwithstanding the destruction of a large part of the exposition by fire, August 14, this article will be of interest to many of our readers.*]

The display of the E. W. Bliss Company, Brooklyn, N. Y., at the Brussels International Exposition includes a large and varied collection of sheet metal working machines. The first of these is a large hydro-mechanical press, which combines the sustained and powerful squeeze of hydraulic action with the speed and accuracy of a merely mechanical press. The pressure exerted ranges from 20 to 600 tons, and is controlled by a safety valve to any desired point between these limits. The mechanical and the hydraulic motions are quite distinct. As soon as the clutch is thrown in the toggle straightens out so that the punch comes to within almost touching distance of the piece to be worked. At that moment the hydraulically actuated die bed effects the working pressure on the blank, rising the short distance required to accomplish the squeeze and returns while the punch is quickly raised to its starting position. The entire cycle takes less than 3 sec., and 20 strokes per minute may be thus utilized. The press operates without vibration, shock or noise, so that it may be placed on an ordinary solid shop floor, thus obviating the heavy cost of foundations necessary for drop stamps, heavy screw presses, &c. The smooth but powerful and continued pressure of this machine permits results to be obtained in a single squeeze which otherwise call for seven or eight operations and annealings. The manufacture is therefore much more rapid, not to speak of the elimination of annealings, and in addition this machine is easier than mechanical presses on the dies and they last much longer.

The company shows a whole line of machines for every phase of tin can and box manufacture. The well-known Bliss top and bottom zig-zag stamping presses are exemplified by an automatic and semi-automatic machine. The first, for cutting and stamping blacking boxes simultaneously, takes a full lithographed sheet, which is clamped in the carrier by a single movement and feeds it automatically under the die. The cuts are staggered, one touching the other as nearly as possible, so that the maximum economy in tin plate is attained. The finished pieces drop through the back of the press by gravity and the scrap, separated from the goods, is cut off in small pieces at every stroke. The press runs at 60 to 100 strokes per minute, according to its size and shape, and the whole operation is automatic, the sheet carrier returning to its original position after the last cut, ready for another sheet. The division is very exact, insuring coincidence between the cuts and the printing on the lithographed sheets, and as one operator can easily attend to two or more machines, the economy in labor and stock is great. The semi automatic lid machine works on the same principle, but the sheet carrier is pushed along by hand and stopped automatically in the right place for each cut. The operation, however, calls for practically no effort on the part of the operator, who, when once used to the work, can catch every stroke of the press. Aside from their great labor and stock saving qualities, these machines have the great advantage of presenting no possible danger to the operator's hands, which are not required to be near the tools while the press is in action.

An automatic body making and soldering machine is also shown, which produces lock seamed and soldered can bodies at the rate of 100 per minute. The cut blanks are simply piled in between inclined supports at one end of the machine and from start to finish the operations are entirely automatic, the finished body being ejected, properly wiped, cold and firm enough for immediate handling. It does all these operations simultaneously and much quicker than any one operation could be done separately, with a great deal more uniformity, and requires only a single operator. The bodies are now ready for flanging, which is done in an automatic machine that can be connected to the body former so that the bodies drop from one machine into the other, where they are flanged and automatically ejected at the rate of 60 per minute.

The company's line of inclinable power presses is represented by several improved models, with a new style of shaft and crank connection. The eccentric portion of the shaft is so made that it fills the entire space between the bearings and practically does away with the tendency to twist or bend under pressure. The crank connection transmits the motion of the eccentric shaft through wearing surfaces at least four times as large as usual.

The company has made a special study of straight sided presses and exhibits some characteristic models. Their most interesting feature is the Wilzin patent pressure controller, which permits these presses to be used not only for cutting, piercing and shaping work, but also for heavy embossing and similar work that is usually done in drop hammers and heavy screw presses. It acts as a sort of safety valve, and if the shaft meets greater resistance than the press is calculated to overcome, due to excessive thickness of stock or a punch adjusted too low, the compensator permits the slide to recede slightly at the extreme end of the stroke, thus allowing the shaft to complete its revolution without releasing the pressure on the piece being worked.

The Bliss swaging machines, for shaping, tapering, reducing, pointing, &c., such articles as metal pen and pencil holders, sewing machine needles, spectacle sides, metal umbrella rods, and, in the larger size machines, bicycle and automobile tubes and fittings, steel center bits, &c., are also shown. In comparison with turning, grinding and milling, these machines are said not only to permit a much greater output, but to eliminate loss of stock.

Valve Gear of the New Cochrane Open Heater

In *The Iron Age* of June 10, 1909, there appeared an illustrated description of the new Cochrane feed water heater, which had just been placed on the market at that time by the Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. This heater was a new model combined heater and receiver, for use in connection with exhaust steam heating and drying systems. One of the special features of the heater was the extra large separator, which was intended to purify all the exhaust steam delivered by the engine, including not only that entering the heater to raise the temperature of the boiler feed water, but also the surplus passing out to the heating or drying system. To cut the body of the heater out of service for cleaning or inspection while the heating system continued in operation, a manually controlled valve was provided to shut the separator off from the heater body and another to close the passage between the separator trap and the heater overflow. The latter was necessary in order that the trap might continue to drain the separator when the heater was out of service without allowing steam to enter the heater through the separator drain pipe and trap.

It is necessary that both valves be closed when it is desired to cut the heater out, and some provision must be made against accidental opening of the trap if a man is to enter the heater while the separator is receiving steam. In small heaters it was found practicable to connect the spindles of the two valves together and to turn them by a single lever. The handle for operating the valves is attached to the spindle of the upper one, while a connecting rod driven from a short crank on this spindle operates a second crank keyed to the spindle of the lower valve.

The steam valve between the separator and the heater is of the semi-cylindrical rotating type and is held against its seat by springs and also by the pressure

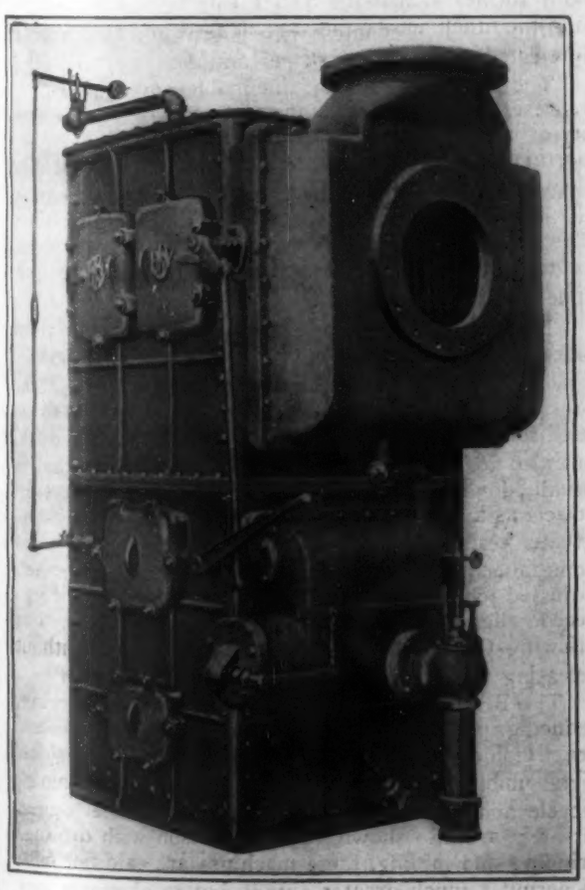


Fig. 1.—The Cochrane Feed Water Heater with Improved Valve Gear, Built by the Harrison Safety Boiler Works, Philadelphia, Pa.

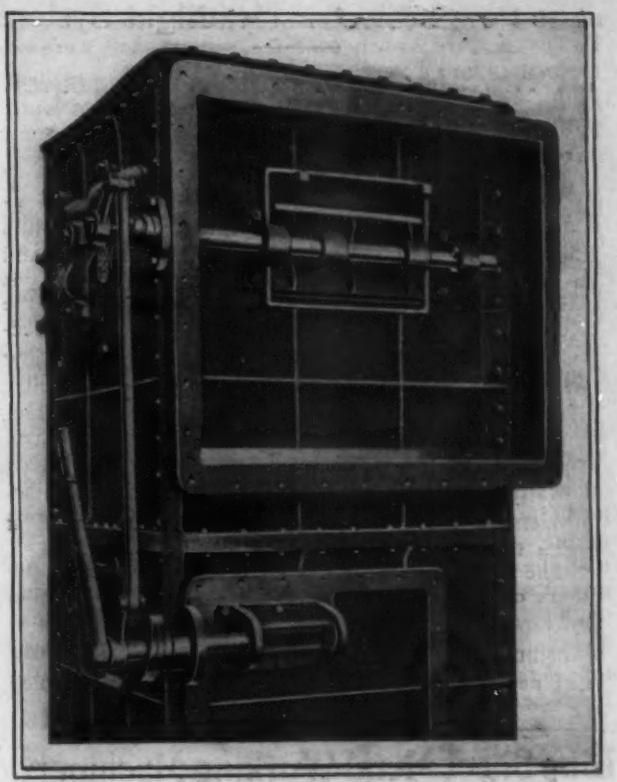


Fig. 2.—Arrangement of Valves and Valve Gear in Cochrane Heater.

of the steam. Where a pressure of 5 lb. or more is carried in the heater the total pressure over the valve of a large heater would render operation difficult by forcing the valve tightly against its seat. To obviate this a special valve gear, shown in Fig. 1, has been devised, in which the handle is attached to the spindle of the lower valve instead of to that of the upper and the lower end of the connecting rod, engaging the pin on the short crank of the lower spindle, is slotted so that the latter has a certain excess of motion over that of the upper spindle. The amount of this excess motion is so adjusted that in closing the upper valve shuts off first, as shown in Fig. 2, and then remains stationary, while the lower one rotates through the remaining arc of its motion, which it is enabled to do by the lost motion in the connecting rod. Thus the upper valve is closed while there is still pressure in the heater to balance the steam pressure on the outside of the valve. Subsequently the lower valve closes, cutting off the heater, after which any steam contained therein will either be condensed or escape from the vent pipe, which always forms part of an open heater. Once both valves are closed the operating handle is removed from its spindle before the cleaning doors of the heater are opened, making it impossible for the steam valve to be opened until the handle is replaced.

In opening the valves the lower valve will swing through an arc sufficient to establish communication for steam passing through the separator drain pipe and trap into the heater, thus equalizing the pressure on the steam valve before the latter begins to move. As soon as the pressure is the same on both sides of the valve the latter will slide easily and the operation of opening can be completed. During this operation the valve in the vent pipe of the heater should be closed to permit the pressure to build up in the heater when the lower valve is first opened.

The American Iron and Steel Institute.—In furtherance of the plans adopted some weeks ago for the enlargement of the work of the organization, the American Iron and Steel Institute has opened headquarters at room 606, 30 Church street, New York. Howard H. Cook, who has been appointed assistant secretary of the Institute, is in charge.

The Peters Electric Headlight System

A New Headlight for Steam Locomotives Employing a Turbo-Generator

A new electric headlight system for steam locomotives has been placed on the market by the R. G. Peters Mfg. Company, 133 Grandville avenue, Grand Rapids, Mich., which consists of a turbo-generator and an electric arc lamp. The particular advantages claimed for the system are that it is as efficient as the electric headlight system now used at high speed electric interurban cars; it provides for a high or low power headlight, as may be demanded by the rules of the road or circumstances, and it is the logical system for providing steam locomotives with electric headlights, as the generator is steam driven. Fig. 1 shows the turbo-generator, Fig. 2 the assembled rotating element, Fig. 3 the two-carbon model of lamp and Fig. 4 the distribution of light from it.

The turbo-generator has all the advantages of the others of this type of economical steam consumption and low maintenance cost, and in addition is built to withstand the stress of railroad service. The turbine is of necessity small, but each part has been designed

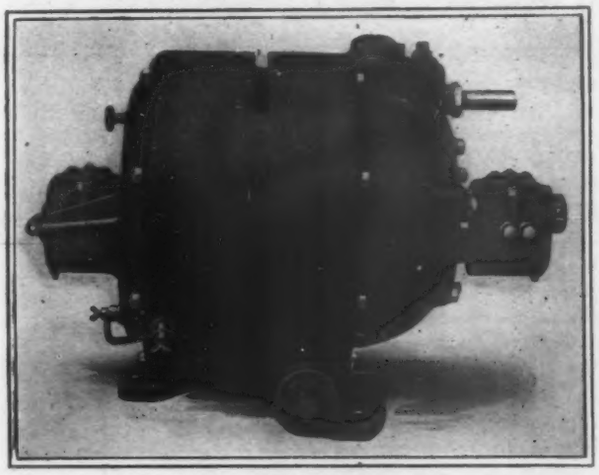


Fig. 1.—Turbine Generator Used with Electric Headlight System of the R. G. Peters Mfg. Company, Grand Rapids, Mich.

as simply as possible, so that any broken or worn parts can be easily replaced. The speed regulation is said to be very close and is controlled by a governor of extremely simple design. This governor is shown in Fig. 2 as a part of the assembled rotating element. All the parts are made of wrought or rolled metal, except the sleeve, which is surrounded by a heavy spring and bound at each end by a steel ring. The buckets of the turbine wheel are so formed and proportioned as to receive the steam from the nozzle efficiently and also from the intermediate reguiding buckets. The wheel is made from a solid disk of homogeneous wrought steel, which tends to give it great strength. The bucket is formed by a combination of a milled recess in the solid wheel plate and a specially formed partition fitted into slits and caught securely in place.

In addition to the regular control governor an emergency governor is provided, whose only function is to shut off the steam if by any chance the turbine overspeeds. This becomes operative when the speed is about 15 per cent. above the normal and when the emergency trip operates, it closes the emergency valve and the turbine is shut down automatically without any damage to any of its parts. When the main steam valve is closed by the operator and the pressure in the steam chest drops to zero, or nearly so, this valve automatically resets itself. An end-thrust collar is provided to take care of any end thrust of the shaft. This collar is so designed that it can move along, but cannot turn on the shaft, so that if the bearing should become overheated, due to its running dry, the thrust collar cannot seize on the bearing. This mechanism is so arranged that the end play of the shaft can be easily and quickly varied.

The generator is simple in construction, and, as far

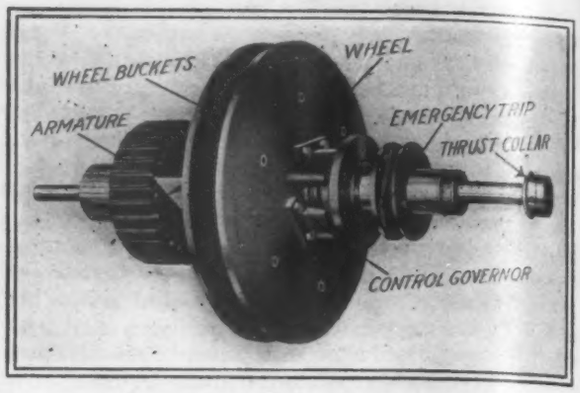


Fig. 2.—Assembled Rotating Element.

as possible, all parts have been made readily accessible. The path of the magnetic flux is liberal in area and the wrought iron field cores are cast in place, which feature tends to increase the permeability of the magnetic circuit and consequently reduce the amount of wire required in the field coils. The pole shoes are laminated, thus reducing the losses due to eddy currents. The normal working load is 900 watts, which is sufficient to operate the arc headlight and five 8-cp. incandescent cab lights, but the design is such that a long run at a 50 per cent. overload is possible without damaging the generator in any way. The armature is built of iron punchings annealed, varnished on both sides and separated at intervals by punchings of insulating material, so that the eddy current loss in the armature is reduced to a minimum. The winding is of the ring type, and as the coils do not overlap and ample clearance is also allowed, a coil can be easily and quickly rewound. The insulation of the coils is thoroughly impregnated with a heat resisting varnish that is proof against oil, acid and water, and all is

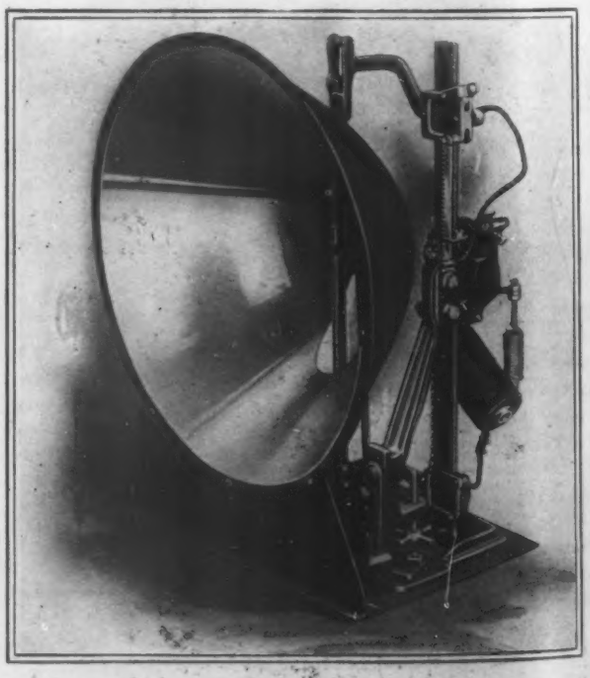


Fig. 3.—Two-Carbon Lamp in Reflector.

tested at 250 volts, or more than eight times that normally carried by the wires of the coils. The armature and commutator can be easily removed from the shaft. The latter is self-contained and built on the armature

sleeve, which fits into the armature spider. It is designed to stand very high speed, and a liberal number of segments have been provided. To relieve the operator on the road of the annoyance of filing down insulation between segments the mica is milled to a sufficient depth to last the lifetime of the commutator. On account of the high speed at which it revolves no foreign substance will remain lodged between the segments, and short circuiting of the armature is impossible, due to the absence of mica between the segments and the commutator surface.

The field coils are spool shaped and can be easily removed. They are wound with a copper ribbon having a cross sectional area equivalent to that of a No. 5 wire. A strip of insulating material wound about the copper ribbon and the entire coil itself are impregnated with heat resisting varnish. The use of a copper ribbon instead of wire results in less space being occupied by the field coil and placing both terminals on the outside of the coil, which reduces the chance of grounding. The shoes on the ends of the pole pieces are designed to cover a large proportion of the armature surface and are laminated like the pole pieces. To remove a shoe it is only necessary to withdraw the through bolt

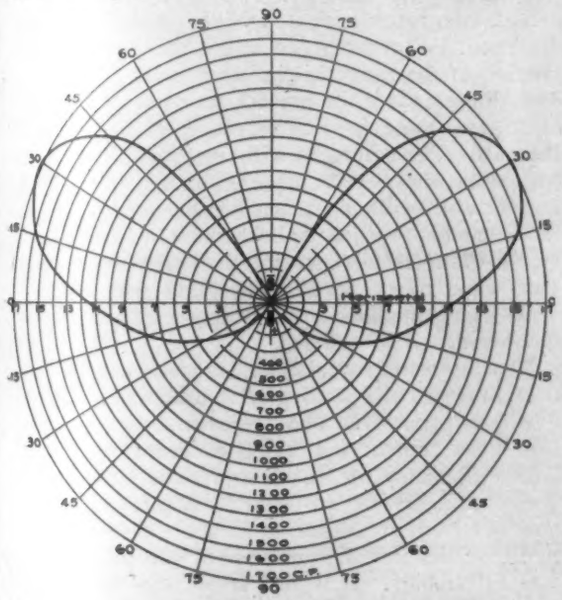


Fig. 4.—Curve Showing the Distribution of Light in the Vertical Plane from a Two-Carbon Lamp.

holding it in place and slip the shoe off the pole piece tongue, which extends into the shoe.

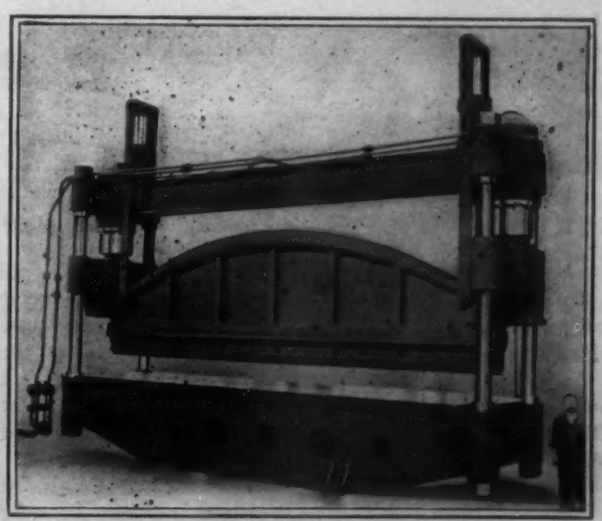
The most important points to be considered in connection with a locomotive headlight are the color of the light, the reliability of the lamp in operation, the ease with which it can be maintained in satisfactory working condition and the simplicity and durability of its construction. The first is especially important, as it should not be such as to cause the color of the signal lights to appear different than they really are. With the two-carbon type of lamp a soft, mellow light is produced, which, it is said, does not under any circumstances burn green. This lamp is so proportioned that it can be mounted in the reflectors ordinarily used by the railroads for oil headlights. Both electrodes are carbon and are in a vertical position. To maintain the arc at the focal point of the reflector each carbon is fed as it burns away by a mechanism working automatically and feeding them at the proper relative rate. It is said that the light produced by this lamp is easier on the eye and at the same time more powerful than any other type of electric headlight. All parts are made of high grade material and are liberally proportioned to withstand the strains of railroad service. The lamp can be quickly and easily trimmed and adjusted and will burn about eight and one-half hours for each trimming. The voltage at the terminals is normally about 27½ volts and the current consumed about 25 amperes. Fig. 4 shows a distribution curve of the light obtained from a test of one of these lamps, and it will be noticed that the intensity of the arc is about 1700 cp.

For illuminating the tracks satisfactorily on curves the headlight can be mounted on a turntable consisting of a round iron plate bolted to the headlight case and pivoted to the metal base plate, which is fastened to the boiler. The round plate is supported at its periphery by rollers held down by springs and the whole can be turned by a wire rope running back to the cab. The wiring for the cab lights is such that they may be turned off or on regardless of whether the headlight is burning or not. A double throw switch located in the cab enables an incandescent lamp to be substituted for the electric arc. This incandescent lamp is mounted in the reflector just in front of and below the focal point and is used when trimming the arc lamp, in its stead when the rules of the road require a less powerful headlight than the electric arc and in place of it should it fail to work satisfactorily.

In the design of the system the number of wearing parts has been kept as low as possible. These can be easily and quickly renewed. In the turbine the only wearing parts of importance are the main bearing and the thrust collars. The valve and the governor parts, which are the only other members subject to rubbing, are so lightly loaded and have such little movement that the wear is negligible. In the generator the only parts subjected to wear by friction are the brushes, the commutator and the bearings. The commutator can be readily trued up by turning and the brushes and bearings may be easily and quickly replaced.

A Large Wood Press

R. D. Wood & Co., 400 Chestnut street, Philadelphia, Pa., have recently completed and shipped to the Fore River Shipbuilding Company, Quincy, Mass., the large keel plate bending press shown in the accompanying engraving. The overall length of this press is 28 ft., and it has a capacity to bend plates 25 ft. long. The bottom platen, which is of semi-steel, was cast at the builders' Camden foundry. It weighs 105,000 lb., and is 7 ft. wide. A special arrangement of operating



Press for Bending Keel Plates 25 Ft. Long, Built by R. D. Wood & Co., Philadelphia, Pa.

valves has been provided, so that one end of the top beam, which weighs over 50,000 lb., can be lowered while the other remains stationary. One point of special interest about the press, aside from its large size, is that it was built in nine weeks to fill a rush order from the Shipbuilding Company, and that this time includes the making of the designs and patterns for the castings.

Activity on the Cuyuna Range

The Kennedy Mine the First Shipper—Other Lake Superior Iron Ranges

MARQUETTE, MICH., August 13, 1910.—Much exploratory and development work is in progress in the new Cuyuna district in Minnesota. It is only within the past two or three years that general attention has been attracted to the field, yet it was as long ago as 1902 that the first systematic prospecting was carried on. This was by Cuyler Adams, the pioneer of the range. Then George H. Crosby, Rogers, Brown & Co., Pickands, Mather & Co., the Jones & Laughlin Steel Company and other individuals and mining concerns entered the district, with the result that the exploratory operations have now extended over a very considerable area. The first producer is the Kennedy mine at Rabbit Lake, the fee of which is owned by the Orelands Mining Company, G. H. Crosby and Wm. Harrison. It is 4 miles northwest of Deerwood and 3½ miles from the new town of Crosby, being on the so-called "North Range." Work at this property was started by the Rogers-Brown interests two and a half years ago. The shaft is down between 300 and 400 ft. Much lateral development has been carried on, and a stockpile of some 50,000 tons of ore has been accumulated. Such shipments as will be made this season will be forwarded over the Soo Line to the Wisconsin Central docks at Ashland, but next year the lake port will be Duluth. The Rogers-Brown lease calls for a minimum production of 100,000 tons a year, with the property developed. The same interests are developing a second mine in Section 11, 46-29, adjacent to the town of Crosby. The Orelands Company controls 700 acres. Guyler Adams is its president. The Brainerd Mining Company has 900 acres. This land has been leased to a steel consuming concern and is being explored. Drills also are at work on the properties of the Salisbury and Agate Lake Mining companies. The C. M. Hill Lumber Company of Saginaw, Mich., is exploring the Thomas Feigh lands in Section 16, 46-29, and is said to have located an extensive deposit. Drills are, in fact, at work in every direction on the Cuyuna.

On the Gogebic

A prospective producer on the Gogebic range is one that Ferdinand Schlesinger of the Newport Mining Company plans to open to the north of the Palms property in the Bessemer district. The tract consists of 80 acres, and is owned in fee by the county of Houghton, Mich. Exploratory work has been in progress with such satisfactory results that the Schlesinger interests have agreed to spend $250,000 in its development within the next five years.

The Newport Mining Company is to erect a hospital at Ironwood for the accommodation of its Gogebic range employees. The building will be of brick, 40 x 100 ft., and two stories. The Bonnie shaft at the Newport mine has been closed on account of the lack of demand for the quality of ore produced there. The men have been transferred to other workings of the property.

The recent accident at the G shaft of the Pabst mine at Ironwood, Mich., in which a 10-ft. hoisting drum burst, was most unusual. That no lives were lost was remarkable. The accident was due to the breaking of two cogs on the pinion driving the drums. This caused a jolt of the drum which stripped all the remaining cogs from the pinion, leaving the drum with no control except the hand brake, which was useless under the circumstances. The drum was pulling a 5-ton skip of ore, which was at the collar of the shaft, and with no control on the drum this skip dropped back with great rapidity, causing the drum to revolve so rapidly as to explode it. Fragments from the machine tore through the roof and front of the building, one of several hundred pounds going through the roof and falling back in the engine house.

New Work in the Iron River District

The Gleason and Goodman tracts in the Iron River district of the Menominee range, the development of which is now being undertaken, will be the first properties that the New York State Steel Company has operated in Michigan, though it is now working several mines on the Mesaba range. The terms of the lease from M. E. Gleason call for the highest royalty and bonus ever paid in the Iron River field. The royalty is 50 cents a ton. The deposit is estimated to contain fully 3,000,000 tons. Another piece of new work that is being started in the Iron River district is the sinking of a shaft to develop the ore found with drills on the Hall property in section 19, 43-34. This tract has been explored by the Florence Iron Company.

Railroad Extension on the Eastern Mesaba

The United States Steel Corporation, which a few years ago penetrated the extreme western portion of the Mesaba range with its Duluth, Missabe & Northern Railroad, is preparing to enter the extreme eastern portion of the range in similar manner. Its Duluth & Iron Range road, the present terminus of which is at the Spring mine, is to be extended 10 miles or more to the east. The extension will tap a large belt of timber owned by the Steel Corporation and other interests, and it also will open considerable areas of mineral land, much of which is held under option by George A. St. Clair and his associates. These holdings aggregate some 10,000 acres. The lands will be explored, with strong likelihood that a number of mines will be developed.

An interesting work just completed on the Mesaba iron range is the sinking of a concrete shaft at the Scranton property. The operation had been in progress more than a year, being conducted by the Foundation Company of New York. The shaft is 285 ft. deep and nearly 16 ft. square. A pumping station is now being cut at a point 30 ft. above the bottom. The Scranton lies in the southwestern outskirts of the village of Hibbing. It is held under lease by the Lackawanna Steel Company, but will be operated by Pickands, Mather & Co. The fee is owned by the State of Minnesota. It is estimated to contain approximately 20,000,000 tons of ore.

The Scranton formerly was known as the Elizabeth. The property adjoins the site of 20 acres upon which the United States Steel Corporation is establishing its new headquarters for the Hibbing district.

Railroad Equipment Orders.—Concerning the New York Central car requirements the *Railway Age Gazette* says that about 8000 box, gondola and hopper cars are being figured on, but that definite action will probably not be taken before January 1. Of the 260 locomotives which the New York Central Lines have decided to purchase, as heretofore reported, it is understood that orders for about 200 will probably not be placed for several months. The 21 freight locomotives ordered for the Michigan Central are considered a part of the 60 locomotives which the Vanderbilt lines are supposed to have placed. The New England Coal & Gas Company, Boston, is asking prices on 300 hopper cars and the Dairy Shippers' Despatch is again asking for prices on 100 refrigerator cars. The Havana Central is inquiring for 100 flat cars and 50 to 150 box cars, all to have steel underframes. The Baltimore & Ohio has ordered 5 Mallet locomotives from the Baldwin Locomotive Works and the Guantanamo & Western 3 from the American Locomotive Company.

New Tools and Appliances

A Large Ferracute Trimming Press.—Several heavy trimming presses for use in a prominent locomotive works have been built recently by the Ferracute Machine Company, Bridgeton, N. J. Two sizes of press were built, some for pressures of 300 tons and other for 200 tons, the former containing a side punch for similar work of a lighter character, which adds considerably to the capacity of the tool. The bed, which in the larger size measures 30 x 50 in., the bolster and the ram contain T-slots for die clamps. The stroke of the main press is 12 in., with a 10-in. adjustment, and the side punch has a stroke of 3 in. and a bed measuring 15 x 30 in. The drive of the machine is double geared, power being transmitted from the flywheel shaft by a pinion and gear to an intermediate shaft at the rear which in turn drives the large gear mounted on the main shaft through a second pinion. This arrangement gives a gearing ratio of 50 to 1. A clutch is provided for the press which enables the operator to start or stop it at any point in the stroke.

The Davis Expansion Boring Tool.—A number of improved boring tools have been developed by the Davis Expansion Boring Tool Company, Broadway and Bremen avenue, St. Louis, Mo. These tools are made of all styles and 21 sizes to meet the conditions and requirements of every shop, and are intended to screw on the end of an ordinary arbor or shank and be used either in a lathe, boring mill or drill press. One of the points of superiority claimed for this tool over the ordinary cutter lies in the ease and quickness with which adjustments can be made to compensate for wear. This tool is adjusted to any size within its range by simply inserting a key wrench in the squared hole of the adjusting screw which operates a double expanding tool steel wedge that forces the cutters outward.

Automatic Nut Burring Machine.—The Mechanical Equipment Company of Canada, 645 St. Lawrence Boulevard, Montreal, Canada, has brought out a machine which is designed to meet the need of nut manufacturers for a power machine capable of removing any form of burr that can be developed on a hot pressed nut. It is said that this machine has not only demonstrated its ability to completely remove the worst form of burr, but it can also put a skin finish on the nut if desired. The machine is simple in design, well built, and possesses structural features which make it especially adapted for nut and bolt works where the question of economy is considered. The operation of the machine is entirely automatic and the nuts require no attention after being placed in the stationary chute by the operator. The capacity of the machine is given as 14,000 nuts, ⅝ to 1½ in. internal diameter per 10-hour day.

Combination Air Compressor and Gas Engine.—The Flickinger Iron Works, Bradford, Pa., is manufacturing a combination gas engine and air compressor for supplying power and compressed air simultaneously. Both the engine and the compressor operate as a combined unit, one end of a single cylinder being used as an explosion chamber to develop the power while the other acts as a compressor. This arrangement enables the machine to be instantly converted into a simple gas engine while running or to throw the compressor into commission at any time, a feature which would be especially applicable to shops where power is required continuously and compressed air only at intervals.

Barr Drilling and Tapping Attachment.—H. G. Barr, Worcester, Mass., is equipping all of his drill presses with the automatic tapping attachment for converting a drill press into a combination drilling and tapping machine, which was illustrated and described in *The Iron Age* March 24, 1910.

Portable Electric Radial Drill.—The United States Electrical Tool Company, 1938 West Eighth street, Cincinnati, Ohio, has made a couple of changes in the portable electric drill illustrated and described in *The Iron Age*, July 30, 1908. These are mounting the drill on a truck so that it can be moved from place to place and providing it with two speeds, namely, 280 and 450 rev. per min. instead of the one speed with which the other type is equipped. As now built these tools will drill at factories for drilling the frames and also for general any angle and are used more especially in automobile drilling around the car.

Improved Single Crank Trimming Press.—The Toledo Machine & Tool Company, Toledo, Ohio, has brought out a new type of single crank trimming press for drop forgings. The detached outboard pedestal bearing has been eliminated in this machine, which reduces the floor space and tends to keep the flywheel shaft in alignment. The press is provided with an unusually heavy balance wheel of small diameter, which provides sufficient power for obtaining the maximum output, and the press is operated by a block clutch with gravity controlling mechanism. Double back gears are provided for the press, which is intended for trimming long forgings for crank shafts and similar work.

Lathe Milling Attachment.—The Young Machine & Tool Company, Worcester, Mass., has placed on the market a lathe milling attachment that is adapted for small shops and garages where there is not enough work to warrant the purchase of a regular milling machine. This attachment can handle a wide range of work and can be readily attached to or removed from a lathe. Either hand or power cross feed is available, the power feed being obtainable from the lathe itself by connecting the table on the attachment with the lathe cross slide. In this way a range of feeds is obtained equal to that available on the lathe. When hand feed can be used to better advantage, the cross slide and the table are disengaged. The dividing head furnished enables 133 divisions to be obtained. This head is attached to its base, so that it can be swiveled to a maximum angle of 55 degrees from the vertical and its position indicated by graduations. Much of the work for which this attachment is adapted can be bolted directly to the table, which is provided with a T-slot throughout its entire length and has a working surface of 4 x 22 in. The maximum distance between centers of the attachment is 13 in., and the dividing head center can be adjusted vertically to a hight of 5½ in. above the table.

Automatic Twist Drill Grinder.—A. E. Mill, Cincinnati, Ohio, has designed a twist drill grinder intended to simplify the operation of drill grinding, which is more or less complex, as correct grinding requires that the cutting edges, in addition to being of the same length, shall have a proper and uniform angle, and the clearance is so shaped as to give good support to the cutting edges and at the same time permit the free cutting action. The machine is entirely automatic in operation and will grind drills ranging from 3-16 to 3 in. in diameter. While being ground the drill revolves continuously at uniform speed, and the ordinary two-lip drill oscillates twice in one revolution upon a center which exactly coincides with the axis of the drill. This oscillation produces the required amount and form of clearance and is caused by a cam working against the stationary roller. In addition to the oscillating movement the drill is reciprocated to and from the emery wheel twice during each revolution by a second cam operating through a lever upon the block in which the drill spindle is mounted. The point of the drill is in contact of the wheel while the clearance for one lip is being ground, and is then withdrawn from the wheel an amount sufficient to bring the opposite lip in the correct position for grinding. The automatic feed of the drill is also effected by this reciprocating motion. Both automatic and hand feed are provided, and the former can instantly be released by disengaging the pawl from the ratchet wheel operating the feed, or it can be released at any predetermined point by an adjustable pin on the drill spindle sleeve striking the lower part on the trip lever and disengaging the pawl. The oscillating movement of the emery wheel is effected by an eccentric and it serves to prevent the cutting face of the wheel from clogging up. An adjusting screw is provided so that the entire face of the wheel may be used, thus keeping the wear uniform. For different sizes of drills the distance to the center of oscillation is changed to correspond.

Trade Publications

Electrical Apparatus.—General Electric Company, Schenectady, N. Y. Three bulletins. No. 4742 is devoted to the intensified arc lamp designed by the company for general illumination on direct-current circuits. The principal characteristics of the lamp are high efficiency and the daylight quality of its light. No. 4753 describes the G. E. Madza 400 and 500 watt incandescent lamps for standard lighting service in large stores, armories, factories, &c., as economical substitutes for other units of high candle power and clusters of small low candle power lamps. No. 4756 gives a graphic description of the ventilation of horizontal steam turbine alternators of 750-kw. capacity and should be instructive and interesting to those connected in any way with the operation of these machines.

Electric Novelties.—Ohio Electric Works, 6304 Ellen avenue, N. W., Cleveland, Ohio. Catalogue. Concerned with a large line of electric novelties and appliances, which includes lamps for operation with dry or storage batteries, flash lights, electric heating devices, massage machines, batteries, telephones, telegraph instruments, measuring instruments, small motors and generators, and a number of electric toys. All of the different appliances are illustrated and brief descriptions are given.

Transmission Chains and Sprockets.—Baldwin Chain & Mfg. Company, Worcester, Mass. Catalogue No. 10. Lists a number of different styles of chains and sprockets for transmission purposes. These include detachable bicycle chains in which the links are readily removable, block automobile chains, block and roller detachable and riveted chains and a special truck chain. Full size drawings of the different chains are given and tables of the different diameters of the various sizes of sprockets made are also included. A formula for calculating the pitch diameter of sprockets for any number of teeth is appended.

Soft Steel Sheets.—West Penn Steel Company, Brackenridge, Pa. Pamphlet. Calls attention to a number of different varieties of steel sheets which are manufactured for various purposes. These include blue annealed one and three pass cold rolled sheets, single pickled cold rolled sheets, re-annealed full pickled and full cold rolled open hearth steel sheets, special sheets for automobile and metal furniture work, tube steel sheets, metallic barrel and basket stock, electrical sheet steel, tack plate, chute steel and powder can stock. Tables giving the weights of the various sizes and gauges in which these sheets are manufactured are appended.

Multiple Spindle Automatic Screw Machine.—Davenport Machine Tool Company, New Bedford, Mass. Booklet. Gives general description and specifications for a multiple spindle automatic screw machine having a capacity for screws ½ in. in diameter and 2 in. long. A detailed description of the construction of this machine is given, which is supplemented by a number of engravings and sectional views.

Patternmakers' Supplies.—The Cleveland Fillet Company, 1444 East Forty-ninth street, N. E., Cleveland, Ohio. Catalogue and price-list. Lists a number of patternmakers' supplies and foundry chaplets. These include the Crescent fillets made in a number of different styles and sizes in both wood and leather, polished steel tools for pressing the fillet in position, corrugated steel joint fasteners, brass, malleable iron and wood dowel pins, rapping plates and draw screws, rules, pattern lumber, white metal and brass pattern letters and figures in a number of different fonts, steel hand clamps, chaplets, glue, shellac and lamp black, and the Foley band saw filing and jointing machine.

Spring Fitting Furnaces.—W. S. Rockwell Company, 50 Church street, New York City. Circular No. 11. Devoted to the Rockwell spring fitting furnace, which is designed to heat steel uniformly and cleanly. The advantages claimed for this furnace are locating the combustion chamber under the heating chamber, so that no hot blast or flame impinges directly upon the steel, which is always covered by a soft vapor and completely shielded from the atmosphere, placing the burner in the furnace directly under the eye and hand of the fitter, and an even distribution of heat. The furnace is entirely iron bound, heavily lined with firebrick, and is very strong and durable. Any average bricklayer, it is said, can build the furnace from the detailed drawings furnished by the maker, as no special shapes or tiles are required other than the burner tiles which are furnished with the ironwork and the burner. Another strong point claimed for this furnace is that a large number of springs can be turned out per day and all will pass rigid inspection. As regularly built these furnaces are equipped to use oil as fuel, but if desired gas burners can be supplied.

Concrete Piles.—The Raymond Concrete Pile Company, 135 Adams street, Chicago, Ill. Catalogue. Size 6 x 9 in.; pages 160. Calls attention to the use of the Raymond concrete pile in the foundations of structures ranging from manufacturing plants, docks, gas holders and smokestacks to viaducts, office buildings, hotels and private residences. Space is given to a brief sketch of the development of the concrete pile, followed by a description of the method of making and placing the Raymond piles. The advantages claimed for these piles are speed in placing, a greater carrying capacity, freedom from decay and a large initial economy. There are numerous illustrations in the book showing the methods of handling and placing the piles as well as the structures built on them. In a number of instances these illustrations are supplemented by brief descriptions of the structures. Data of the initial economy of the Raymond piles are given, together with a brief form of specifications for and a list of users of these piles.

Sheet Metal Stampings.—Bay State Stamping Company, 380 Chandler street, Worcester, Mass. Pamphlet. Relates to a line of sheet metal stampings which this company manufactures. These include oil hole covers, oil cups, screwdriver ferrules, emery wheel dressers, and turning tools for truing and shaping emery wheels. All the products are illustrated and the views are supplemented by brief descriptions.

Soldering Fluxes.—The Baltimore Chemical Company, Baltimore, Md. Three circulars. Relate to the Perfection soldering flux, which is said to produce stronger and neater work at a lower cost. It is also said to be free from uncombined acids of any kind, so that discoloration of the work and injury to the health of persons using it are avoided. This flux is packed in packages of four different sizes ranging from kegs of 55 lb. to barrels of 500 lb. It is made ready for use by diluting in the proportion of three parts of water to one of flux, and when so prepared 1 lb. will cap approximately 1000 ordinary sized cans.

Laundry Machinery.—American Mangle & Roller Company, 400 Main street, Racine, Wis. Pamphlet. Concerned with a line of hand and power operated laundry machinery suitable for hotels, hospitals and institutions. The different machines illustrated and described include mangles in a large variety of styles of sizes, an extractor or partial dryer, cylinder washing machines, and a dryer heated by stove, gas, steam or hot water. Brief descriptions accompany the illustrations and space is also given to the engines and boilers supplying the power for operating the machines.

Core Drills.—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 9001. Deals with the Davis calyx diamondless core drills, which are used to determine the character, order, thickness and extent of materials beneath the earth's surface by extracting cores or cylinders from an annular hole. The principal fields of application of this tool are in contracting, stone quarrying and coal or metal mining. This drill uses either a steel cutter or chilled shot or crushed steel as a cutting agent, depending upon the character of the work to be done. The former is employed for soft and medium rocks and one of the latter two for harder material. This drill removes cores from 1⅝ to 18⅝ in. in diameter to all depths up to 4000 ft. The illustrations show the drill in use for a number of different purposes, the cores removed and the different parts of the drills. The construction of the different parts and the operation of the drill are described and a brief table of specifications is appended.

Tool and Cutter Grinder.—The Miami Valley Machine Tool Company, Dayton, Ohio. Two loose leaf circulars. Illustrates and describes its No. 1 universal tool and cutter grinder, in which the emery wheel head and the table swivel instead of the body of the machine, which gives a quick adjustment. Other advantages are that the machines can be placed close to the wall or other machines, thus economizing floor space, and a vertical adjustment is required only when backing off taper reamers. An illustrated description of this machine was printed in *The Iron Age* February 24, 1910.

Automatic Time Register.—The Automatic Time Stamp Company, 160 Congress street, Boston, Mass. Folder. Illustrates the style D automatic time register for recording the starting and finishing time of various orders, jobs or operations, so that the elapsed time may be readily ascertained for cost keeping purposes. This method is now in use in nearly all the large manufacturing establishments in this country. Two types of register are built, one for stamping the time and the other, which is provided with a slide bar arrangement which can be shifted, to print the words stop and start, or in and out, in addition to printing the time. With either of these machines different styles of impressions can be made, such as the year, month, day and hour, which is the most common; the month, day and hour, and another which is the same as the first except that the time is indicated, as a.m. or p.m., the change at noon and midnight being automatically made.

Radial Drills.—The Mueller Machine Tool Company, 2425 Colerain avenue, Cincinnati, Ohio. Four loose leaf circulars. Pertain to the line of new radial drills which the company has recently designed. These are built in four sizes for either cone pulley or feed box drive, with 2½, 3, 3½, 4 and 4½ ft. arms. An illustrated description of the 4 and 4½ ft. model was printed in *The Iron Age* May 26, 1910.

Spring-Seat Valves.—The Crosby Steam Gauge & Valve Company, Boston, Mass. Set of nine loose leaf circulars. Deals with the Crosby spring-seat valves, which are primarily intended for high pressures and are recommended for superheated steam, although they are also well adapted for use as throttle valves for steam engines. The characteristic feature of the valve is the construction of its seat, which allows a greater contact surface, a resilient action which prevents jamming when the valve is closed, allows free action regardless of any variation in temperature, and prevents abrasion by the steam when the valve is

partly open. Other features claimed for this valve are strength, quality, durability and freedom from leakage at high pressure.

Blast Furnaces.—William B. Pollock Company, Youngstown, Ohio. Supplement No. 19 to the company's general book of views of blast furnaces which it has recently built. The photographs in this issue are of new stoves at the plant of the New Jersey Zinc Company, Palmerton, Pa.

Unions.—The Jefferson Union Company, Lexington, Mass. Circular. Describes the Jefferson style F male and female union, an illustrated description of which was printed in *The Iron Age* April 28, 1910. The special feature of this fitting is a spherical ground brass-to-iron joint in which a brass ring forms the seat or contact, thus doing away with any possibility of the union becoming corroded.

General Mill Supplies.—W. D. Allen Mfg. Company, 151 Lake street, Chicago, Ill. Catalogue No. 28. Size 6¾ x 9⅝ in.; pages 638. This is the company's 1910 catalogue, describing and illustrating the large and varied line of mill supplies which it handles. It includes all sorts of equipment for the mill, ranging from power transmission belts and pulleys to small hand grenades for extinguishing fires, and small pipe fittings. All the different pieces of equipment are illustrated and numbered to render ordering very easy. The alphabetical index of the different articles is very complete and covers 20 pages. This is supplemented by a three-page index to the figure numbers, which makes it very easy to locate any article either by name or number.

Heating System.—The Harrison Engineering Company, 42 East Twenty-third street, New York City. Bulletin No. 4. Concerned with the Harrison Aertube heating system, in which the fan system is employed. This system is said to be eminently satisfactory for large buildings because of its positive action and the ease with which the temperature and quantity of air and the point of admission are controlled. In the majority of these systems steam coils are used which require boilers, feed pumps, traps, &c., with their attendant expenses. In the Harrison system, tubular heating sections are used, the air from the fan passing through the tubes in a direction parallel to the heating surface and in a direct line with the distributing ducts. While coal is the fuel most often used in this system the heater is especially adapted for the utilization of waste heat from the exhaust of gas engines, furnaces, forges, ovens, &c. This utilization of waste heat is either independent of or in conjunction with the combustion of fuel on the heater grate, the supply there being regulated to make up a deficiency. Crude oil and producer gas are also said to give satisfactory results, the efficiency guaranteed being at least 80 per cent.

Metal Sheets.—The Stark Rolling Mill Company, Canton, Ohio. Folder. Concerned with Toncan metal sheets and roofing. These sheets combine durability, which was the one merit of the early iron sheets, with workability, the one great merit of the modern steel sheet which is used in their place. The Toncan sheets are less subject to corrosion than the former and more easily workable than the latter.

Milling Cutters.—Barber-Colman Company, Rockford, Ill. Catalogue A. Size 4⅞ x 7¾ in.; pages 63. Lists a line of cutters in a number of different styles and sizes for various purposes. There include plain milling cutters, milling cutters with nicked teeth, which are especially desirable for heavy milling, as the nicking breaks up the chips and permits a heavier cut than would otherwise be taken; side milling cutters, both plain and interlocking; straight, spiral and shell end mills; T-slot cutters, metal slitting saws, screw slotters and angular cutters. This comprises a portion of the regular line manufactured by the company and in addition special types of formed cutters can be made either from drawings submitted by the customer or a model can be designed by the firm to meet the requirements of the case.

Fillets.—The Benskin Mfg. Company, Canton, Ohio. Several circulars. Treat of the Perfect leather and wood fillet, which is made in a number of different sizes. Other foundry supplies, such as letters for patterns, dowel pins of wood and brass, and rapping plates are also covered.

Fuel Economizers.—The Green Fuel Economizer Company, Matteawan, N. Y. Bulletin No. 131, entitled "Heat Economy in Paper Mills." Contains a discussion of the most economical methods of utilizing heat in paper mills, and points out that contrary to the usual custom of using high pressure engines in order to have exhaust steam available it is possible to obtain better plant economy by using high efficiency condensing engines or turbines and heating the water necessary in the mill by a fuel economizer. The results of a number of tests in paper mills are given, where it is shown that an economizer can be used either to heat the boiler feed water alone or for heating the other water necessary about the plant and obtain a substantial fuel economy in either case. Photographs of a number of recent installations are shown, together with typical layouts of economizers in paper mills.

Firebrick Shapes.—Boulter Mfg. Company, 234 North Twenty-third street, Philadelphia, Pa. Circulars. Deal with a line of firebrick parts for electric, combustion, gas, oil and coal furnaces. These include bricks, stoppers, saggers, disks, tiles, slides, tubes and supports in all the regular sizes. One of the specialties of this company is its line of muffles, which includes four different shapes open at one or both ends in a great range of widths, hights and lengths. In addition to all the standard sizes of furnace parts and muffles, the company is prepared to manufacture special sizes and shapes.

Dredges.—The Bellefontaine Foundry & Machine Company, Bellefontaine, Ohio. Catalogue. Calls attention to a line of steam dredges, which are built in four sizes ranging from 1 to 2½ cu. yd. with either wire rope or chain for dredging and excavating. There are a number of illustrations showing the dredges in use and views of constructional details. These are followed by a general description of the machines, a partial list of users, and a table of dimensions of the different styles.

Coal Punchers.—Ingersoll-Rand Company, 11 Broadway, New York City. Bulletin No. 5002. Relates to the new Ingersoll pick machine or puncher operated by compressed air, for undercutting in horizontal seams and pitching seams whose angle does not exceed 15 degrees from the horizontal. The advantages claimed for this machine over hand mining are a lower cost, as one machine is capable of doing the work of from six to fifteen miners; improved quality of the output, more rapid development, a reduced number of working places for the same daily output, and greater safety. The machine is described in considerable detail, supplemented by illustrations of the various parts, and there are also a number of illustrations of the puncher in use. A brief table of specifications and a list of repair parts with illustrations complete the bulletin.

Road Machinery.—Acme Road Machinery Company, Frankfort, N. Y. Catalogue. Size 6 x 9 in.; pages 136. This is the company's general catalogue describing and illustrating a line of road building machinery, contractors' and township supplies. The various machines used in the building of roads and accessories, such as wagons and plows, are all illustrated and described. In a number of cases considerable space is given to a description of the operation of the machine supplementing the description of the machine itself and in all cases a brief specification is appended.

Structural and Ornamental Ironwork.—T. H. Brooks & Co., 3104 Lakeside avenue, Cleveland, Ohio. Pamphlet. Covers a line of structural shapes, roof trusses, cast iron columns, vault lights, coal hole covers, sidewalk plates and store fronts. All of these lines are illustrated and in addition there are views of a number of buildings for which this company furnished the structural work.

Contractors' Equipment.—Walter A. Zelnicker Supply Company, Zelnicker Building, St. Louis, Mo. Circular. Lists a line of contractors' supplies, which include rails, spikes, locomotives, cars, boilers, bridges, buckets, cableways, air compressors, cranes, engines, pumps, steam shovels and a number of other pieces of equipment suitable for the use of contractors on all kinds of work.

Gas Producers.—The Forter-Miller Engineering Company, Pittsburgh, Pa. Catalogue. Concerned with a line of gas producers, which are made in a number of different types. These include the Forter-Trump mechanically operated gas producer with and without hand feed, the Forter hand-operated producers, and the Forter-Miller types of water sealed gas producers. All of these different types are illustrated and a general idea of their construction is given by sectional drawings. An illustrated description of the Forter-Trump gas producer was printed in *The Iron Age* May 26, 1910.

Couplings.—Central Tube Company, Pittsburgh, Pa. Mailing card. Refers to a line of wrought iron couplings, both black and galvanized, which are made in sizes ranging from ⅜ to 3 in. The advantages claimed for these couplings over the malleable ones generally used are greater strength, more service and lower cost.

Shafting.—The Fitzsimmons Company, Youngstown, Ohio. Price list. Concerned with the Fitzsimmons cold drawn polished Eclipse shafting, which is made in a number of sizes from 3-16 to 10 in. in diameter. In addition the firm also manufactures cold drawn steel in square, hexagonal and flat bars. The company can also furnish special grades and shapes for various purposes where they may be required and are prepared to make other sizes of rounds, squares and hexagons than those usually carried in stock.

High Speed Steel.—Lowenthal & Co., D. S. Morgan Building, Buffalo, N. Y. Booklet. Size 3½ x 6 in.; pages 16. Lists the different sizes of Elco high speed steel which it handles as sole American and Canadian representative for Vickers Sons & Maxim, Ltd., Sheffield, England. Handy high speed hints, tempering instructions, lists of extras and a table of weights of all shapes per foot are included. For ready reference several pages are devoted to the prices of the most commonly used high speed taper and straight shank twist drills.

Water Softener.—Dodge Mfg. Company, Mishawaka, Ind. Pamphlet entitled "Saving Fuel." Refers to the use of the Eureka water softener and purifier for removing scale forming impurities from boiler feed water. The operation of the apparatus is illustrated and described and a partial list of users is appended.

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought are given elsewhere in our weekly market report

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1⅞ in. round and square	₩ lb 1.90¢
1½ to 4 in. x ⅜ to 1 in.	₩ lb 2.10¢
1½ to 4 in. x ⅛ to 5-16	₩ lb 2.10¢
Rods—⅝ and 11-16 round and square	₩ lb 2.10¢

Angles:

	Cts ₩ lb
3 in. x ¼ in. and larger	2.10¢
3 in. x 3 16 in. and ⅛ in.	2.25¢
1½ to 2½ in. x ¼ in.	2.20¢
1½ to 2½ in. x 3-16 in. and thicker	2.10¢
1 to 1¼ in. x 3-16 in.	2.20¢
1 to 1¼ x ⅛ in.	2.30¢
⅞ x ⅛ in.	2.40¢
¾ x ⅛ in.	2.50¢
⅝ x ⅛ in.	3.55¢
½ x 3-32 in.	4.35¢

Tees:

1 in.	2.65¢
1¼ in.	2.45¢
1½ to 2½ x ¼ in.	2.15¢
1½ to 2½ x 3-16 in.	2.25¢
3 in. and larger	2.15¢
Beams	2.10¢
Channels, 3 in. and larger	2.10¢
Bands—1½ to 6 x 3-16 to No. 8	2.30¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.60¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black

	One Pass, C.R Soft Steel.	R. G. Cleaned.
No. 16	₩ lb 2.90¢	3.00¢
Nos. 18 to 21	₩ lb 2.95¢	3.10¢
Nos. 22 and 24	₩ lb 3.05¢	3.20¢
No. 26	₩ lb 3.10¢	3.30¢
No. 28	₩ lb 3.20¢	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment, ₩ lb 12 @14½

Patent Planished, W. Dewees Wood, ₩ lb A, 10¢; B, 9¢ net.

Galvanized.

Nos. 14 to 16	₩ lb, 3.30¢
Nos. 22 to 24	₩ lb, 3.55¢
No. 26	₩ lb, 3.75¢
No. 28	₩ lb, 4.10¢

No. 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—

Galvanized.

Nos. 22 and 24	₩ lb 5.75¢
No. 26	₩ lb 6.25¢
No. 28	₩ lb 7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd
No. 24	₩ 100 sq. ft. $3.85	4.80
No. 26	₩ 100 sq. ft. 2.95	4.00
No. 28	₩ 100 sq. ft. 3.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:

IC, 14 x 20	$6.35
IX, 14 x 20	7.60

A. Charcoal:

IC, 14 x 20	$5.40
IX, 14 x 20	6.50

American Coke Plates—Bessemer—

IC, 14 x 20, 107 lb	$4.40
IX, 14 x 20	5.40

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8.50
IX, 20 x 28 with an 8 lb coating	10.50

Seamless Brass Tubes—

List November 13, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 22¢

Brazed Brass Tubes—

List August 1, 1908. 19¾¢ ₩ lb

High Brass Rods—

List August 1, 1908. 14¼¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 14¼¢ ₩ lb

Brass Wire—

List August 1, 1908. 14¼¢ ₩ lb

Copper Wire—

Base Price, Carload lots mill 14 ¢

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18 ¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.

Planished Copper, 1¢ ₩ square foot more than Polished.

METALS—

Tin—

Straits Pig ₩ lb 35

Copper—

Lake Ingot	₩ lb 14¢
Electrolytic	₩ lb 14¢
Casting	₩ lb 14¢

Spelter—

Western ₩ lb 6¢

Zinc.

No 9, base, casks ₩ lb 6 ¢ | Open ₩

Lead.

American Pig	₩ lb 5
Bar	₩ lb 6¢

Solder.

½ & ½, guaranteed	₩ lb 22
No. 1	₩ lb 19
Refined	₩ lb 17½

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ lb
Hallett's	
Other Brands	

Bismuth—

Per. lb $2.00@2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), for remelting

Rods & Wire	Base Price
Sheets	Base Price

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 10.75
Copper, Heavy and Wire	₩ lb 10.50
Copper, Light and Bottoms	₩ lb 9.50
Brass, Heavy	₩ lb 7.50
Brass, Light	₩ lb 5.75
Heavy Mechine Composition	₩ lb 9.50
Clean Brass Turnings	₩ lb 7.00
Composition Turnings	₩ lb 8.50
Lead, Heavy	₩ lb
Lead, Tea	₩ lb
Zinc Scrap	₩ lb

Nicholson Files

Sales of good files should remind you
You can all avoid a "rut" —
Just by stocking up and selling
Files like these that *always cut.*

Some Hardware merchants get in the "rut" of stocking any kind of files just because they are *cheap.* But such files don't *sell* and are "dead stock" on their shelves.

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